Railway Age Gazette

DAILY EDITION

Vol. 48. NEW YORK—JUNE 20, 1910—ATLANTIC CITY. No. 24

PUBLISHED DAILY (eight times, June 15-June 23), BY
THE RAILROAD GAZETTE (INC.), 83 FULTON STREET, NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscription, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico..... $5.00 a year.
Canada ..... $6.00 a year.
Foreign Edition (London)..... $8.00 a year.
Single Copies .....15 cents each.

Shop Edition and the eight M. C. B. and M. M. Convention Daily issues, United States and Mexico, $1.50; Canada, $2.00; Foreign, $3.00.

☞If mailed from Atlantic City the postage on this copy of the *Daily Railway Age Gazette* is seven cents. Unless the full amount is affixed to the wrapper or envelope, the post office will not forward the paper.

Application made at the Post Office at New York, N. Y., for entry as mail matter of the second class.

While locomotives using low superheated steam may not require any special attention in the lubrication of valves and cylinders, highly superheated steam requires continuous lubrication. When engines are drifting and there is no flow of steam carrying the lubricant to the piston and valves, these surfaces are very hot and some means must be provided for their lubrication. On the Great Western Railway of England, superheated steam is used on a large number of engines, and special provision is made to prevent cutting under these conditions. An automatic valve is connected to the throttle lever so that a small amount of steam passes through a ½-inch pipe to the cylinders when the main throttle valve is closed and the engine is drifting. In this way sufficient lubrication is provided under all conditions of operation.

The old constitution and bylaws of The Railway Supply Manufacturers' Association were revised by a committee appointed some months ago for that purpose, and its report, with one amendment, was accepted by the members at the annual meeting day before yesterday. The changes were not radical, except, perhaps, in one respect. It has been the practice for years to decide questions brought before the body as a whole, by a majority of *representatives* present. According to new section 3, article 4, of the bylaws, and article 3 of the constitution, this power is confined to the member—("any corporation, co-partnership, or individual engaged in the manufacture and sale of railway materials," etc.) who "shall be entitled to one vote on all matters, which vote shall be cast by its properly accredited delegate." There is, however, no definition of "properly accredited delegate." In the old constitution and bylaws, article 3 of the former and section 1 of the latter were in conflict as to whether the concern or person who paid the prescribed assessment, or the individual representative, was the voting member; and while they now conflict in the same way, new section 3, article 4, seems to define the intent. That the old constitution and bylaws were faulty was, of course, evident from the fact that they were ordered revised. It is too bad, however, that the committee did not go further in its work. The old laws were unnecessarily verbose and lacked words of meaning. Few changes have been made. Section 5, article 4, of the bylaws, while providing that, should the members in any district "fail to elect a member or members to the executive committee," that vacancy shall be filled by the committee, there is no provision as to how many constitute a quorum. In other words, one vote only might be cast in any district, and that one vote would elect. Further, section 6, article 2, of the bylaws makes it possible for any four members, or one-third only, of the executive committee, to decide any question within its province. While they're all jolly good fellows, and the contingency is remote, it is conceivable that this unusual practice might cause trouble. Perhaps the same remarks should be applied to all the points noted in our criticisms. But since it is the aim of those who have their shoulders to the wheel to perfect a real business organization, the foundation should be designed to prevent any possible collapse.

Twenty years ago the Master Mechanics' Association held its convention at Old Point Comfort, following the Master Car Builders, which met the previous week. As each of the conventions began on Wednesday, those who attended both had to be absent from home almost two full weeks. A resolution, presented by Mr. Setchel, was passed providing for a conference with the Master Car Builders' Association, with a view to arranging that the latter meet the second Wednesday in June and the Master Mechanics the following Monday. R. H. Briggs was then president and Angus Sinclair secretary. The address of welcome was made by M. E. Ingalls, president of the Chespeake & Ohio and the Cleveland, Cincinnati, Chicago & St. Louis. It reviewed the incidents of the civil war around Old Point, Norfolk and Richmond; the desperate naval battle between the Monitor and the Merrimac; the interesting history of Jamestown and Williamsburg, and the campaigns of McClelland and Grant and Richmond. This address was one of the prominent and pleasing incidents of the convention, and at one time a resolution was adopted that similar addresses by men prominent in the railway business form a regular part of the proceedings of the conventions, but it is disregarded and seems to have been forgotten. One of the important subjects under discussion at that time was: "Is it safe to run a pony truck under fast express engines?" After the conflicting opinions had been stated, the meeting hesitated to adopt any definite resolution and it was decided to change the question to, "What are the relative merits of mogul and ten-wheel engines for passenger and freight service?" After this question was discussed at length, it was left in the same unsettled condition in which it remains today. At this convention the first report on "Compound Locomotives" was presented. It was read by J. Davis Barnett; other members of the committee were John Player, H. D. Garrett and F. W. Dean. At that time there were in operation a two-cylinder Pitkin compound on the Michigan Central and a four-cylinder Baldwin compound on the Baltimore & Ohio. In reading the proceedings of this convention one is impressed with the fact that it was of unusual interest; the reports were remarkably well prepared and the discussions equally valuable There is a report on "Fireboxes Above the Frame," showing the necessity of larger grate area than that obtained for large engines with the

deep firebox between the frames. With the exception of the very wide Wootten firebox, the large firebox as now generally used had not then been introduced. There was also a report on iron and steel axles and on heavier axles for tenders. A report on exhaust pipes and nozzles and steam passages and stacks by C. F. Thomas, A. W. Gibbs and John Hill, was the beginning of that important experimental work, carried along by committees under the leadership of Robert Quayle and Prof. W. F. M. Goss that led to the final report which included definite rules for the proportion and design of these details.

LOCOMOTIVE HEADLIGHTS.

The relative merits of oil, acetylene and electric headlights have been the subject of considerable discussion of late in railway circles. This discussion has been rendered more spirited by the well meant, if sometimes misdirected, zeal of certain legislatures and railway commissions in the attempt to enforce the use of high power headlights. The whole problem seems to be one which does not admit of any general solution and in which local conditions must play a large part.

The original purpose of carrying a light at the head end of a locomotive was probaby to enable the engineer to see obstructions on the track ahead. With the old fashioned railways having no signal system and a rather precarious right of way, and with the trains moving at comparatively slow rates of speed, the oil headlight probably served its purpose fairly well. It soon became evident, however, that with increasing speeds, little reliance could be placed upon the detection of obstructions by the engineer. While the headlight still served a purpose in warning trespassers on the track it had practically no value for the engineer. The introduction of signals of various kinds, and finally of the block system of control, has made the engineer independent of the headlight, and the movement of trains is controlled now by the dispatcher's orders and by the condition of the track ahead as indicated by the block signals. The safety of a train and the lives of the passengers which it carries are dependent to a large degree upon the accurate working of these signals and their correct interpretation by the engineer. Experiments which have been made on various roads and at various times have shown pretty conclusively that the signals can be read more correctly when a low power headlight is employed and that the use of the electric light in particular is apt at times to be confusing in the extreme. This seems to be due to two causes: First, the puzzling reflections from the roundels in the signal which are apt to be confused with the signal lights themselves, the signal frequently showing, for instance, a green light indicating safety when there is no such light there; and second, to the obscuration of the signals by the glare from an approaching headlight. As trains are quite apt to be on sidings at stations, this last condition frequently prevents the correct reading of the home signal. It has also been noticed that classification signals on approaching engines are almost indistinguishable when the engine carries an electric light, the green signal being particularly liable to obscuration. Of course, this is a serious matter since on some roads the green classification signal indicates another section of a train on the same track. It would seem that these same objections would apply to any high power lamp, whether electric or gas.

The claim that obstructions are more readily seen with the electric light has been substantiated by experiments. The same experiments, however, go to show that most obstructions would not be visible at a sufficient distance to permit of the stopping of a passenger train going at full speed. Obstructions are rarely visible over a thousand feet under the best conditions and it would take nearly double this distance in which to stop a passenger train going 60 or 70 miles an hour.

In spite of what has been said, it must be admitted that under certain circumstances and on many roads, the electric headlight serves a good purpose. On single track roads in the west and south having long stretches of track running through uninhabited country, where landslides and fallen trees are a source of danger, electric headlights have proven their value. It is significant that their introduction so far has been largely on this class of roads and in the sections indicated. On a railway which has two or more tracks equipped with block signals at comparatively short intervals, and where the safety of the trains depends almost entirely upon the reading of these signals, it would be foolish to employ a light which would tend to neutralize these safeguards. The safety of trespassers on the track is something which hardly needs to be considered, it is of so little importance compared with the safety of the train and its passengers.

In view of these circumstances, it would seem that the solution of this important matter can well be left to the railway companies. A company which has spent thousands of dollars in perfecting its block signal system should not be compelled to use devices which interfere with the working of that system. On the other hand, if a railway finds that the safe running of its trains is promoted by the use of high power lights, it should be free to use them. The expense of the electric light as compared with the oil lamp is not sufficient to deter any railway from using it if it seems advantageous. It is hoped that a sane treatment of this matter by legislatures and commissions will allow of its being worked out by each road along rational lines in such a way as to best safeguard the traveling public.

GEORGE W. WILDIN.

George W. Wildin, president of the Master Mechanics' Association, represents the increasingly numerous class of mechanical railway officers who, having received their early training in the west, have given the east the benefit of their abilities and riper experience. Though born at Decatur, Ill., 40 years ago, Mr. Wildin received his education at the Kansas State Agricultural College, at Lawrence, Kans., from which he was graduated with the degree of Bachelor of Science in 1892. He immediately entered the Topeka shops of the Santa Fe as draughtsman, but shortly took up the more active life of machinist and later served as locomotive fireman. From the Santa Fe to the Mexican Central as locomotive engineman was the next step in the acquisition of practical experience, and this, with a period of service as superintendent of the Aermotor Company, Chicago, and some locomotive running on the Chicago & Alton, covers the chief events in his history until he appears as machinist and later mechanical engineer of the Plant System at Savannah, Ga., having been appointed to the latter position in the late nineties. His work there was called in 1901 to the attention of William McIntosh, who had recently gone to the Central of New Jersey as superintendent of motive power and who was on the lookout for a man of exactly Wildin's practical experience and educational qualifications. In three years, however, he outgrew any position the Central of New Jersey could offer and in 1904 he became mechanical superintendent of the Erie. Later he went to the Lehigh Valley, whence he was soon called to become mechanical superintendent of the New York, New Haven & Hartford.

Wildin's strong personality, partially accounted for by a magnificent physique and abounding good nature, has given him a kind of success as the administrative officer of an important department of important roads which never could have been obtained on the basis of technical knowledge alone. It is a common remark of visitors to his office that his desk is always clear and he never seems to have much to do, though the care of upwards of 1,200 locomotives and about 40,000 cars of all kinds and the necessary shop plants for their repair seem to constitute the nucleus of a man's job. It is merely another case of organization, and an organization backed up and conducted in such a spirit that every man in it down to the wiper

in the roundhouse knows that the work laid out for him to do must be done in the best way that he knows how, and that when done he will receive the proper credit for it. Probably it will be difficult to find a better organization for running a mechanical department than that established on the New Haven road, nor is its perfect working due wholly to the compactness of the railway system itself. It is possible that Wildin's training in military organizations has had something to do with the efficiency of his present department, though a milder or more reasonable "old man" toward the well-intentioned employee would be hard to find.

His most effective work for the Master Mechanics' Association has been that in connection with the handling of locomotives at terminals and in those details of locomotive design and repair in which his practical experience as a locomotive engineman and fireman has shown the possibility of improvement. He has also been active in the work of committees on matters relating to motor cars and the revision of standards, and for the Master Car Builders' Association on couplers and draft equipment. Few railway men at 40 have achieved as much with no "pull" but an energetic ambition, few have the promise of a more brilliant future.

LOCOMOTIVE DEVELOPMENT.

In the light of recent progress a quotation from the late M. N. Forney, written 22 years ago, is of considerable interest. Commenting on a report concerning a large locomotive which was then being built at the Schenectady Locomotive Works Mr. Forney said: "The information given is not very definite, so that it is not possible to say whether it is really the largest passenger engine ever built, but the fact that there are examples of passenger engines which weigh 100,000 lbs. or over, leads to reflection and anticipation. How big will locomotives be 50 years from now? is a question that a mechanical engineer cannot help asking himself and his associates. Within 30 years the size of passenger engines has been nearly or quite doubled. Will this rate of increase continue, and in the year 1918 will there be passenger engines running which weigh 200,000 lbs. and over?"

For several years an American railway has been running a passenger locomotive weighing 270,000 lbs; another road is running freight locomotives weighing 462,000 lbs., with a number of years yet to come before reaching the date mentioned in the question asked by Mr. Forney. It is only when we apply some such yard stick as this that we are in position to realize the progress which is being made. Passenger locomotives are increasing in weight and capacity because of increasing weight of trains and the greater severity of conditions which they must meet. Passenger engines which were considered very large 10 years ago are now completely outclassed because of changed conditions. Freight locomotives are increasing in weight and capacity because large units tend to decrease operating expenses. No one would build a large locomotive if a small one would answer the requirements. This tendency toward larger units is not a fad, but is the result of well-defined demands, based upon the success of the advances which have been made in recent years. Those who are interested in the production of greater power for both passenger and freight service are wondering what the limits of size and weight really are, and when they are to be reached. In fact, the question raised by Mr. Forney is continually coming up.

Locomotives for both passenger and freight service have been designed with such large proportions as to point very definitely to the limitations of present methods of firing. The demand in this direction has already reached the point of requiring the consumption of 10,000 lbs. of coal per hour to develop the full capacity of which the locomotives are capable.

Mallet type locomotives have been so successful in demonstrating the possibilities of effecting savings in operation as to lead more than one operating official to the conclusion that still larger ones are desirable. Existing Mallet locomotives have done so well in helper and slow freight service, in which they have been employed, as to lead to a definite demand that they should be built for road service at comparatively high speeds. This, however, should be approached conservatively. Locomotives of the Mallet type have actually been placed in passenger service. This tendency toward still larger units does not seem to be in any sense a mistake, and it does not seem desirable to question the policy of increase as far as power and capacity are concerned, but development has reached a point leading to the suggestion that there may perhaps be better ways of securing a part of the power which is desired than by merely adding to previous designs in the matter of size and weight. With such figures of consumption of fuel as have been mentioned, the meaning of which all motive power men appreciate in connection with the difficulties of firing, comes the conviction of the importance of utilizing to the fullest extent every possible factor which will tend to make a pound of coal go as far as possible in the hauling of trains.

While economy of fuel has always been important in the minds of American railway officials, it has never been considered as paramount to certainty of operation in getting over the road. The time is coming, and very rapidly, when economy will take a still more prominent place, not for its own sake alone, but because of the increased capacity which may be obtained by the aid of factors which produce economy. European railways have been very far in our lead in fuel economy, largely because of the very much higher cost of their fuel. Locomotive development of the future in this country must necessarily follow in this direction, not alone because of the increasing cost of fuel, but because of the weight and size of locomotives involved, as well as the difficulty in handling a sufficient amount of fuel to perform the work required.

We may very well ask whether we are using material as well in the very large locomotives as it was used in the days when locomotives were smaller. It is time that serious, systematic attempts should be made to get more work per pound of locomotive by the use of alloy steels and other improved materials which will reduce the total weight per pound of tractive effort. That much may be accomplished in this direction is already known, but thus far there are no locomotives running on American railways which have approached foreign designs with respect to the saving of weight which has been shown to be possible in the lighter locomotives of European practice. In this direction lies a wide field for future development.

Superheating is no longer experimental except as to details and in view of the success both abroad and on this continent, which it has already attained, superheating has established itself as a factor having important possibilities in the direction of increased capacity. No one need hesitate to adopt superheating to-day. The only question is one of the details of the superheater.

Feed water heating presents a field of possibilities for increased capacity in which success has already been demonstrated to a sufficient extent to promise results which are well worth while.

In the automatic stoker we have another possibility of a line of development which compels attention because of the large amount of fuel involved in the locomotives of large capacity already in service and in the still larger ones which are suggested, but are yet undeveloped. A successful mechanical stoker will free the locomotive from a bondage which has become rigid. This development should be encouraged to the utmost. There is reason to believe that we are on the eve of the appearance of successful mechanical stokers which will fully meet the present difficulty in this direction.

Taken as a whole, the locomotive is at present in its most interesting stage of development, requiring the greatest knowledge and skill for future designing. If the limits of size

and weight have not actually been reached, and there is no reason to believe that they have been, this seems to be an appropriate time to review practice as it stands, having in mind the possibilities of improving the use of factors which are already established, in order to be sure that we have gotten the utmost out of them before proceeding further along the present line of making every thing larger. This is a time for the application of the best knowledge in designing and for the most careful use of factors we know all about, and for rendering locomotives as economical as possible both in weight and in fuel consumption. At best they are likely to be as large as may be comfortably handled for some time to come, for the locomotive has somewhat outgrown facilities at terminals and in shops.

It is not sufficient that American locomotives should be as simple as possible in construction in order to get over the road with certainty, it is necessary that they should embody features which will enable them to get over the road with certainty and with economy, and if these features making for economy involve complications the issue must be faced and the complications must be developed and perfected in such a way that they will not interfere with regularity of service. This constitutes the problem before designers to-day. Those responsible for the locomotive development of the immediate future certainly have no cause to feel that their problem is uninteresting or too easy.

THE M. C. B. BALL.

TO THE EDITOR OF THE DAILY RAILWAY AGE GAZETTE:

The committee on entertainment has taken great pains with its arrangements, and the ball of Thursday evening showed what could be done. But, in spite of their best efforts, there were two points in which matters were painfully lacking, the floor and the music, two essentials to unconfined joy at a dance. Last year there was some complaint that the floor was rough, so this year, to make amends, the floor was waxed at the last minute, which left it in the condition of a glare of ice. All who danced felt that they were taking their lives on their feet, and moved about in such a gingerly way that pleasure and abandon were impossible. The texture of the floor is all that could be desired, and there is no reason why it should not be made smooth.

Then, as to the music. No fault can be found with the time or the rendering, but the selections for the waltzes were simply atrocious. The conductor should learn that dancers want not only time but rhythm and inspiration, and that the two last do not come from the distortion of a popular air into waltz time. Any tune can be so distorted, from "Old Hundred" to "Here's to the Dead Already, Hurrah for the Next to Die." Three-four time does not constitute a waltz, and it is hard to understand why a conductor should persist in selections that have no tendency to make you dance. Why take an adaptation of "My Southern Rose," that was never intended to be danced to, when such music is available as the old Strauss waltzes, like the "Blue Danube," "Wine, Women and Song," the "Kiss Waltz" or the "Merry Widow?" They are the dances that make the body sway and the feet twinkle.

The same criticisms do not hold for the two-step. Two-four time is not easily adapted to the swing of a song of mandolin sentimentality. They are written for dancing and are danced to. But the waltzes! Well, they aren't waltzes. So if the committee will get busy and see to it that the floor is properly prepared and the conductor selects music that was written for the purpose for which he uses it, we will have a dance "as is a dance," and the conductor may himself even learn a thing or two; and one of the two is to choose music fitted to the purpose for which it is intended.

I want to add that none of the foregoing is intended to be in crisicism of the entertainment committee, or of the committee in immediate charge of the ball. Their work, on the whole, has been done splendidly, and deserves and is receiving the warmest praise.

DANCER.

TO-DAY'S PROGRAM.

MASTER MECHANICS' ASSOCIATION.

Prayer	9:30 A. M. to 9:35 A. M.
Address of President	9:35 A. M. to 9:50 A. M.
Intermission	9:50 A. M. to 9:55 A. M.
To allow those who wish to retire to do so, although all are requested to remain.	
Action on minutes of convention of 1909	9:55 A. M. to 10:00 A. M.
Reports of Secretary and Treasurer	10:00 A. M. to 10:15 A. M.
Assessment and announcement of dues; appointment of Committees on Correspondence, Resolutions, Nominations, Obituaries, etc.	10:15 A. M. to 10:25 A. M.
Election of Auditing Committee	10:25 A. M. to 10:30 A. M.
Unfinished Business	10:30 A. M. to 10:35 A. M.
New Business	10:35 A. M. to 10:45 A. M.
Discussion of Reports on:	
Mechanical Stokers	10:45 A. M. to 11:00 A. M.
Revision of Standards	11:00 A. M. to 11:15 A. M.
Individual Paper by W. S. Hayes, Supt. Loco. Operation, Erie R. R., "Fuel Economies"	11:15 A. M. to 12:00 M.
Topical Discussions:	
"Self-dumping Ash Cans," by H. T. Bentley, A. S. M. P., C. & N. W.	12:00 M to 12:30 P. M.
"Apprenticeship Education," by F. W. Thomas, Supervisor of Apprentices, A. T. & S. F.	12:30 P. M. to 1:00 P. M.
Discussion of Report on:	
Motive Power Development	1:00 P. M. to 1:30 P. M.
Adjournment.	

ENTERTAINMENT.

9 a. m.—Grand march from Marlborough-Blenheim Hotel to Convention Hall, Million Dollar Pier.

10:30 a. m.—Orchestra concert, Entrance Hall, Million Dollar Pier.

3 p. m.—Piano, song and story recital Willa Holt Wakefield, West Solarium, Marlborough-Blenheim Hotel.

9 p. m.—Reception by the president and officers of the American Railway Master Mechanics' Association, Blenheim Exchange, Marlborough-Blenheim Hotel. Cadets de Gascogne, direct from La Scala Theatre, Milan, Italy.

GO TO THE POST OFFICE!

A large amount of mail has accumulated at the office of Secretary Conway on the pier and it would be well for all persons in attendance to call and inquire.

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BUREAU OF INFORMATION.

The information and assistance furnished by the Official Railway Guide Bureau of Information, as announced in the issue of the *Daily* of June 17, has been found to be so valuable and acceptable in relieving members and guests from the trouble of getting tickets and making Pullman reservations that we are requested to repeat the substance

of the statement of the work the bureau undertakes to perform. It has prepared a complete time table of all trains to New York and Philadelphia by both the Pennsylvania and the Philadelphia & Reading, and is also distributing a blank providing for the following entries: Name, booth, time of leaving, by what road and destination. The order, to be left at booth 34 near the main entrance, will be filled by the purchase of tickets and the reservation of Pullman space, which will be marked on the blank and signed by the agent at the ticket office. The ticket, etc., will then be left at any booth designated, or may be called for at booth 34.

SONG AND STORY RECITAL.

On Monday afternoon, at 3 o'clock, in the west solarium of the Blenheim Exchange, Willa Holt Wakefield will give a song and story recital, including the following:

1. The Girl with the Clockings.
2. She Had a Lot of Things When She Came Back.
3. Ten Dirty Little Fingers.
4. Kissing Time, Help Yourself.
5. Monologue—Bill Smith.
6. The Back Yard.
7. A Laughing Song.
8. Sarah's Spectacles.
9. He's My Pal.

Lost—Badge 2686. Please return to the office of the *Daily*.

LUMBER SPECIFICATIONS.

[Through a mistake in the printing office, most of the abstract of the report of the M. C. B. Association on "Lumber Specifications" was omitted from the *Daily* of June 18; the discussion was printed correctly and fully. The entire abstract of the report is therefore reprinted herewith.—EDITOR.]

The Committee on Uniform Specifications and Grading Rules for Car and Locomotive Lumber herewith submits its report and recommendations. This matter has been thoroughly canvassed by committees of the Master Car Builders' Association, American Railway Master Mechanics' Association, the Railway Storekeepers' Association and the various lumber manufacturers' associations throughout the country. The specifications meet the approval of the various committees, and especially of the lumber manufacturers.

In order to have standard descriptions of the various woods used by railroads, the following standard names for car and locomotive lumber were agreed upon by the Joint Committee:

1. Ash. To cover what is known as White Ash, Black Ash, Blue Ash, Green Ash and Red Ash.
2. Basswood. To cover what is known as Linden, Linn, Lind or Lime-tree.
3. Beech. To include Red or White Beech.
4. Birch. To include Red, White, Yellow and Black Birch.
5. Buckeye. To cover what is known as Horse Chestnut.
6. Butternut. To cover wood from tree of that name, also known as White Walnut.
7. Cherry. To include Sweet Cherry, Sour Cherry, Red Cherry, Black Cherry and Wild Cherry.
8. Chestnut. To cover wood from tree of that name.
9. Cottonwood. To cover wood from tree of that name. (Do not confuse with Popple or Poplar.)
10. Cypress. To include Red Cypress, Gulf Cypress, Yellow and East Coast Cypress, also known as Bald Cypress.
11. Elm—soft. To cover what is known as White Elm, Gray, Red and Winged Elm.
12. Elm—rock. To cover what is known as Rock Elm.
13. Douglas Fir. To cover Yellow Fir, Red Fir, Western Fir, Washington Fir, Oregon or Puget Sound Fir or Pine, Northwest and West Coast Fir.
14. Gum. To cover what is known as Red Gum, Sweet Gum or Satin Walnut.
15. Hemlock. To cover Southern or Eastern Hemlock; that is, Hemlock from all States east of and including Minnesota.
16. Western Hemlock. To cover Hemlock from the Pacific Coast.
17. Hickory. To include Shellbark, Kingnut, Mockernut, Pignut, Black, Shagbark and Bitternut.
18. Western Larch. To cover species of Larch or Tamarack from the Rocky Mountain and Pacific Coast regions.
19. Maple—soft. To include Soft and White Maple.
20. Maple—hard. To cover what is known as Hard, Red, Rock and Sugar Maple.
21. White Oak. To include White Oak, Burr Oak or Mossy Cup, Rock Oak, Post or Iron Oak, Overcup, Swamp Post Oak, Live Oak, Chestnut Oak or Tan Bark, Yellow or Chinquapin Oak, Basket or Cow Oak.
22. Red Oak. To include Red Oak, Pin Oak, Black Oak, Water Oak, Willow Oak, Spanish Oak, Scarlet Oak, Turkey Oak, Black Jack or Barn Oak, and Shingle or Laurel Oak.
23. Pecan. To cover wood from tree of that name.
24. Southern Yellow Pine. Under this heading two classes of timber are used: (a) Long-leaf Pine; (b) Short-leaf Pine. It is understood that these two terms are descriptive of quality rather than of botanical species; thus, Short-leaf Pine would cover such species as are known as North Carolina Pine, Loblolly Pine and Short-leaf Pine. Long-leaf Pine is descriptive of quality, and if Cuban, Short-leaf or Loblolly Pine is grown under such conditions that it produces a large percentage of hard summer wood, so as to be equivalent to the wood produced by the true Long-leaf, it would be covered by the term Long-leaf Pine.
25. White Pine. To cover timber which has hitherto been known as White Pine, from Maine, Michigan, Canada, Wisconsin and Minnesota.
26. Norway Pine. Also known as Red Pine, from Michigan, Minnesota, Wisconsin and Canada.
27. Idaho White Pine. To cover variety of White Pine from western Montana, northern Idaho and eastern Washington.
28. Western Pine. To cover timber known as White Pine coming from Arizona, California, New Mexico, Colorado, Oregon and Washington. This is the timber sometimes known as Western Yellow or Ponderosa Pine or California White Pine or Western White Pine.
29. Poplar. To cover wood from the Tulip Tree, Whitewood, Yellow Poplar and Canary Wood.
30. Redwood. To include the California wood usually known by that name.
31. Spruce. To cover Eastern Spruce; that is, the Spruce timber coming from points east of and including Minnesota and Canada, including White, Red and Black Spruce.
32. Western Spruce. To cover the Spruce timber from the Pacific Coast.
33. Sycamore. To cover wood from tree of that name, otherwise known as Buttonwood.
34. Tamarack. To cover timber known as Tamarack or Eastern Tamarack, from States east of and including Minnesota.
35. Tupelo. Otherwise known as Tupelo Gum, Bay Poplar.
36. Walnut. To cover Black Walnut (for White Walnut, see Butternut).

It is the opinion that the specifications which we have proposed cover nearly 95 per cent of the lumber used in car and locomotive construction and maintenance, and the question of drawing specifications for the special hardwoods, such as mahogany and other imported lumber, was left open for further consideration.

RECOMMENDED CLASSIFICATION, GRADING AND DRESSING RULES FOR NORTHERN PINE CAR MATERIAL, INCLUDING WHITE AND NORWAY PINE AND EASTERN SPRUCE.

1. Norway Pine to cover what is known also as Red Pine.

White Pine to cover the timber which has hitherto been known as White Pine, from Maine, Michigan, Wisconsin, Minnesota and Canada.

Spruce to cover Eastern Spruce; that is, the Spruce timber coming from points east of and including Minnesota and Canada.

2. Northern Pine Lumber shall be graded and classified according to the following rules and specifications as to quality, and dressed stock shall conform to the subjoined table of standard sizes, except where otherwise expressly stipulated between buyer and seller.

3. Recognized defects in Northern Pine are knots, knotholes, splits, shake, wane, wormholes, pitch pockets, torn grain, loosened grain, sap stain, checks and rot.

Knots.

4. Knots shall be classified as pin, small and large or coarse, as to size; and round or spike, as to form; and as sound, loose, encased, pith and rotten, as to quality.

5. A pin knot is sound and should not exceed ½ in. in diameter.

6. A small knot is larger than a pin knot and should not exceed 1½ in. in diameter.

7. A large or coarse knot is one of any size over 1½ in. in diameter.

8. A round knot is oval or circular in form.

9. A spike knot is one sawn in a lengthwise direction.

The mean or average diameter of knots shall be considered in applying and construing the rules.

10. A sound knot is one solid across its face, is as hard as the wood it is in, and is so fixed by growth or position that it will retain its place in the piece.

11. A loose knot is not firmly set, but still retains its place in the piece.

12. A pith knot is a sound knot with a pith hole not more than ¼ in. in diameter in the center.

13. An encased knot is one surrounded wholly by bark or pitch.

14. A rotten knot is one not as hard as the wood it is in.

Pitch.

15. Pitch pockets are openings between the grain of the wood containing more or less pitch or bark, and shall be classified as small, standard and large pitch pockets.

16. A small pitch pocket is one not over ⅛ in. wide.

17. A standard pitch pocket is one not over ⅜ in. wide, or 3 in. in length.

18. A large pitch pocket is one over ⅜ in. wide or over 3 in. in length.

19. A pitch pocket showing open on both sides of the piece ⅛ in. or more in width shall be considered the same as a knothole.

Wane.

20. Wane is bark, or the lack of wood, from any cause, on edge.

Sap.

21. White or bright sap shall not be considered a defect in any of the grades provided for and described in these rules, except where stipulated.

Miscellaneous.

22. Defects in rough stock caused by improper manufacture and drying will reduce grade, unless they can be removed in dressing such stock to standard sizes.

23. All lumber for uses described in these rules shall be inspected on the face side to determine the grade, and the face side is the side showing the best quality or appearance.

24. Chipped grain consists in a part of the surface being chipped or broken out in small particles below the line of the cut, and as usually found should not be classed as torn grain, and shall not be considered a defect.

25. Torn grain consists in a part of the wood being torn out in the dressing. It occurs around knots and curly places, and is of four distinct characters: slight, medium, heavy and deep.

Slight torn grain shall not exceed 1-32 in. in depth, medium 1-16 in., and heavy ⅛ in. Any torn grain heavier than ⅛ in. shall be termed deep.

26. The grade of all regular stock shall be determined by the number, character and position of the defects visible in any piece. The enumerated defects herein described admissible in any grade are intended to be descriptive of the coarsest pieces *such grades may contain*, but the average quality of the grade shall be midway between the highest and lowest pieces allowed in the grade.

27. Lumber and timber sawed for specific purposes must be inspected with a view to its adaptability for the use intended.

28. All dressed stock shall be measured strip count, viz., full size of rough material necessarily used in its manufacture.

29. Lumber must be accepted on grade in the form in which it was shipped. Any subsequent change in manufacture or mill work will prohibit an inspection for the adjustment of claims, except with the consent of all parties interested.

30. The foregoing general observation shall apply to and govern the application of the following rules. The rules referred to under Sections 31, 32, 33, 34 and 35 govern 4 or 6 in. strips, and are intended to cover strips used for car siding, car lining and car roofing.

31. B and Better White Pine. Material of this grade should be practically clear and free of all defects, except will admit of not exceeding three or four pin knots, and bright sap not to exceed 25 per cent of the face of the piece.

32. C and Better Norway Pine. Bright sap is no defect in this grade and stained sap will be admitted to the extent of not exceeding 1-5 the surface of the face of the piece, if not in combination with other defects. This grade should be free from shake, rot, splits, but will admit of three or four pin knots.

33. No. 1 Common White Pine, Norway Pine and Eastern Spruce. This grade admits of small sound knots, but should be free from large or coarse knots, knotholes, should have practically no shake, wane or rot, but will admit of bright sap to any extent.

34. No. 2 Common White Pine, Norway Pine and Eastern Spruce. This grade is similar to No. 1, described above, except that it will admit of spike knots, bright or stained sap, slight shake, slight wane on reverse side, but not a serious combination of any of these defects.

35. No. 3 Common White Pine, Norway Pine and Eastern Spruce. This grade, in addition to the defects mentioned in No. 2, described above, will also admit of large or coarse knots, more shake, sap, wane on reverse side that does not affect the tongue or groove and torn or loosened grain, checks, pin wormholes or splits, but no loose knots or knotholes, nor a serious combination of the defects named.

36. No. 1 Common Norway Pine or Decking or Flooring. This grade will admit of sound knots, any amount of sap, and shall be free from shake, wane, rot or large, coarse spike knots.

37. Standard lengths.

Car Siding—8, 9, 10 and 12 feet or multiples.

Car Roofing—5 feet or multiples.

Car Lining—8, 9, 10, 12, 14, 16, 18 and 20 feet or multiples.

Car Decking—9 and 10 feet or multiples.

All orders shall be shipped in the standard length called for unless otherwise specified, but no lengths of either car siding, lining or roofing shall be shipped except in the lengths specified or multiples thereof. Those who do not desire stock shipped in multiple lengths should so specify.

RECOMMENDED CLASSIFICATION GRADING AND DRESSING RULES FOR SOUTHERN YELLOW PINE CAR MATERIAL.

1. Southern Yellow Pine—Under this heading, two classes of timber are used: (a) Long-leaf Pine, (b) Short-leaf Pine.

It is understood that these two terms are descriptive of quality rather than of botanical species. Thus, Short-leaf Pine would cover such species as are now known as North Carolina Pine, Loblolly Pine and Short-leaf Pine. Long-leaf Pine is descriptive of quality, and if Cuban, Short-leaf or Loblolly Pine is grown under such conditions that it produces a large percentage of hard summer wood, so as to be equivalent to the wood produced by the true Long-leaf, it would be covered by the term Long-leaf Pine.

2. Yellow Pine Lumber shall be graded and classified according to the following rules and specifications as to quality, and dressed stock shall conform to the subjoined table of standard sizes, except where otherwise expressly stipulated between buyer and seller.

3. Recognized defects in Yellow Pine are knots, knotholes, splits (either from seasoning, ring hearts or rough handling), shake, wane, red heart, pith, rot, rotten streaks, wormholes, pitch streaks, pitch pockets, torn grain, loosened grain, seasoning or kiln checks and sap stains.

Knots.

4. Knots shall be classified as pin, standard and large, as to size; and round and spike, as to form; and as sound, loose, encased, pith and rotten, as to quality.

5. A pin knot is sound and not over ½ in. in diameter.

6. A standard knot is sound and not over 1½ in. in diameter.

7. A large knot is one any size over 1½ in. in diameter.

8. A round knot is oval or circular in form.

9. A spike knot is one sawn in a lengthwise direction.

The mean or average diameter of knots shall be considered in applying and construing the rules.

10. A sound knot is one solid across its face, is as hard as the wood it is in, and is so fixed by growth or position that it will retain its place in the piece.

11. A loose knot is one not held firmly in place by growth or position.

12. A pith knot is a sound knot with a pithhole not more than ¼ in. in diameter in the center.

13. An encased knot is one surrounded wholly or in part by bark or pitch. Where the encasement is less than ⅛ in. in width on both sides, not exceeding one-half the circumference of the knot, it shall be considered a sound knot. (See Sections 10 and 17.)

14. A rotten knot is one not as hard as the wood it is in.

Pitch.

15. Pitch pockets are openings between the grain of the wood containing more or less pitch or bark, and shall be classified as small, standard and large pitch pockets.

16. A small pitch pocket is one not over ⅛ in. wide.

A standard pitch pocket is one not over ⅜ in. wide or 3 in. in length.

A large pitch pocket is one over ⅜ in. wide or over 3 in. in length.

17. A pitch pocket showing open on both sides of the piece ⅛ in. or more in width shall be considered the same as a knothole.

18. A pitch streak is a well-defined accumulation of pitch at one point in the piece and when not sufficient to develop a well-defined streak, or where the fibre between grains is not saturated with pitch, it shall not be considered a defect.

19. A small pitch streak shall be equivalent to not over one-twelfth the width and one-sixth the length of the piece it is in.

A standard pitch streak shall be equivalent to not over one-sixth the width and one-third of the length of the piece it is in.

Wane.

20. Wane is bark, or the lack of wood, from any cause, on the edge.

Sap.

21. Bright sap shall not be considered a defect in any of the grades provided for and described in these rules, except where stipulated.

Shake.

22. Shakes are splits or checks in timbers which usually cause a separation of the wood between annual rings.

Through Shake—A shake which extends between two faces of a timber.

Ring Shake—An opening between the annual rings.

Miscellaneous.

23. Defects in rough stock caused by improper manufacture and drying will reduce grade, unless they can be removed in dressing such stock to standard sizes.

24. All stock except car sills and framing shall be inspected on the face side to determine the grade. Stock surfaced one side, the dressed surface shall be considered the face side. Stock rough or dressed two sides, the best side shall be considered the face, but the reverse side of all such stock shall not be more than one grade lower.

25. Pieces of siding, lining or roofing with 3-16 in. or more of tongue will be admitted in any grade, provided it does not run more than one-third the length of the piece.

26. In all grades lower than B and better, wane on the reverse side, not exceeding one-third the width and one-sixth the length of any piece, provided the wane does not extend into the tongue, or over one-half the thickness below the groove, is admissible.

27. Chipped grain consists in a part of the surface being chipped or broken out in small particles below the line of the cut, and as usually found shall not be classed as torn grain and shall not be considered a defect.

28. Torn grain consists in a part of the wood being torn out in dressing. It occurs around knots and curly places, and is of four distinct characters: slight, medium, heavy and deep.

Slightly torn grain shall not exceed 1-32 in. in depth; medium, 1-16 in.; heavy, ⅛ in.; any torn grain heavier than ⅛ in. shall be termed deep.

29. Loosened grain consists in a point of one grain being torn loose from the next grain. It occurs on the heart side of the piece and is a serious defect, especially in flooring.

30. Rot, Dote and Red Heart—Any form of decay which may be evident either as a dark-red discoloration not found in the sound wood, or the presence of white or red rotten spots, shall be considered as a defect. Firm red heart shall not be considered a defect in any of the grades of Common Lumber.

31. The grade of all regular stock shall be determined by the number, character and position of the defects visible in any piece. The enumerated defects herein described admissible in any grade are intended to be descriptive of the *coarsest* pieces *such grades may contain*, but the average quality of the grade should be midway between the highest and lowest pieces allowed in the grade.

32. Lumber and timber sawed for specific purposes must be inspected with a view to its adaptability for the use intended.

33. All dressed stock shall be measured strip count, viz., full size of rough material necessarily used in its manufacture.

34. Equivalent means equal, and in construing and applying these rules, the defects, whether specified or not, are understood to be equivalent in damaging effect to those mentioned applying to stock under consideration.

35. Lumber must be accepted on grade in the form in which it was shipped. Any subsequent change in manufacture or millwork will prohibit an inspection for the adjustment of claims, except with the consent of all parties interested.

36. The foregoing general observation shall apply to and govern the application of the following rules:

37. B and Better Car Siding, Lining and Roofing will admit any two of the following, or their equivalent of combined defects: Sap stain not to exceed 5 per cent; firm, red heart not to exceed 15 per cent of the face; three pin knots; one standard knot; three small pitch pockets; one standard pitch pocket; one standard pitch streak; slight torn grain, or small kiln or season checks. Where no other defects are contained, six small pin wormholes will be admitted.

38. Select Car Siding will admit of one standard pitch streak, one standard pitch pocket, or their equivalent; and, in addition, will admit of not exceeding five pin knots and two standard knots, or their equivalent; 10 per cent sap stain; firm red heart; slight shake; heavy torn grain; defects in manufacture or seasoning checks. Pieces otherwise good enough for B, but containing a limited number of pin wormholes shall be graded select. This grade is intended to be accumulated from running *B and Better stock*, and will consist of all the droppings which do not contain defects in excess of those mentioned in this paragraph.

39. No. 1 Common Car Siding will admit of the following defects or their equivalent: Sound knots, not over one-half of cross section of the piece at any point throughout its width. Three pin knots or their equivalent. Wane ½ in. deep on edge not exceeding 1½ in. wide and one-half the length of the piece. Torn grain; pitch pockets; pitch; sap stain; seasoning checks; slight shakes; firm red heart and a limited number of small wormholes well scattered. This grade is intended to be worked from fencing stock, either kiln or air dried.

40. Select Car Lining and Roofing will admit of one standard pitch streak; one standard pitch pocket, or their equivalent, and, in addition, sound knots not over one-half the width of the piece in the rough; 10 per cent sap stain; firm red heart; slight shakes; heavy torn grain; defects in manufacture, or seasoning checks. Pieces otherwise good enough for B, but containing a limited number of pin wormholes shall be graded select. This grade is intended to be accumulated from running *B and Better stock*, and will consist of all the droppings which do not contain defects in excess of those mentioned in this paragraph.

41. No. 1 Common Car Lining and Roofing will admit of the following defects or their equivalent: Sound knots not over one-half the cross section of the piece at any point throughout its length; three pin knots or their equivalent; torn grain; pitch pockets; sap stains; seasoning checks; firm red heart, and a limited number of pim or small wormholes well scattered. This grade is intended to be worked from fencing stock, either kiln or air dried.

42. Standard Patterns. (Insert B/P reference, showing net sizes after working.)

43. All-heart Car Decking or Flooring will admit sound knots not over one-third of the cross section of the piece at any point throughout its length, provided they are not in groups; pitch pockets; firm red heart; shake and seasoning checks which do not go through the piece; loose or heavy torn grain, or other machine defects, which will lay without waste, or will not cause a leakage in cars when loaded with grain. Must be strictly all heart on both sides and both edges.

44. Heart Face Car Decking or Flooring will admit of sound knots not over one-third the cross section of the piece at any point throughout its length, provided they are not in groups; pitch pockets; firm red heart; shake and seasoning checks which do not go through the piece; loosened or heavy torn grain, or other machine defects, which will lay without waste, or will not cause a leakage in cars when loaded with grain. Will admit of any amount of sap provided all of the face side of the piece is strictly all heart.

45. No. 1 Common Car Decking or Flooring will admit of sound knots not over one-half of the cross section of the piece at any point throughout its length, provided they are not in groups; pitch pockets; sap stain; firm red heart; shake and seasoning checks which do not go through the piece; a limited number of pin wormholes; loosened or heavy torn grain, or other machine defects, which lay without waste or will not cause a leakage in cars when loaded with grain.

46. *Standard Lengths:*

Car Siding—8, 9, 10 and 12 feet or multiples.

Car Lining—8, 9, 10, 12, 14, 16, 18 and 20 feet or multiples.

Car Roofing.—5 feet or multiples.

Car Decking or Flooring.—9 and 10 feet or multiples.

All orders shall be shipped in the standard lengths called for, unless otherwise specified, but no lengths of either car siding, lining or roofing shall be shipped, except in the lengths specified or multiples thereof. Those who do not desire stock shipped in multiple lengths should so specify.

Car Sills and Framing.

47. No. 1 Common Heart Car Sills and Framing will admit of sound knots, provided they are not in groups, the mean or average diameter of which shall not exceed two inches; pitch; pitch pockets; slight shake; seasoning checks, or other defects which will not impair its strength more than the defects aforementioned. Must be sawed from sound timber, free from doty or rotten red heart and true to measurements, or at least the measurements at no point on the sill shall be less than the size required. Measurement of the girth at any point throughout the length of the piece must show at least 75 per cent heartwood. Cubical contents shall not be used as basis for obtaining percentage of heartwood under this rule.

48. No. 1 Common Car Sills and Framing will admit of

sound knots, provided they are not in groups, the mean or average diameter of which shall not exceed two inches; pitch; pitch pockets; slight shake; seasoning checks; sap, sap stain, or other defects which will not impair its strength more than the defects aforementioned. Must be sawed true to measurements and from sound timber free from doty or rotten red heart; must be square cornered, except that one inch of wane on one corner or one-half inch of wane on two corners is admissible.

49. Sizes up to 6 in. in width shall measure full when green, and not more than ⅛ in. scant when dry or part dry. Sizes 6 to 12 in. in width shall measure full when green and not more than ¼ in. scant when dry or part dry. Sizes 12 to 16 in. in width shall measure full when green and not more than ⅜ in. scant when dry or part dry. Unless otherwise specified, ¼ in. shall be allowed for each side which is to be dressed. Where stock is wanted dressed smooth all four sides, timber shall be sawed ½ in. full over the dressed sizes required. In pieces 3 by 6 in., and under when ordered in lengths exceeding 30 feet, sound knots shall not exceed one-quarter the width of the face through which they project, and the grain shall not cross sufficient to impair tne strength.

RECOMMENDED CLASSIFICATION AND GRADING RULES FOR LOCOMOTIVE AND FREIGHT AND PASSENGER CAR OAK.

General Instructions.

Those who are not familiar with the anatomy of the oak tree should, when reading over these rules, take into consideration that the rule describes the poorest piece that goes into the grade and that a large per cent is above the grade described.

Definition of Oak for Construction Purposes.

The term 'Construction Oak" means all such products of Oak in which the strength and durability of the timber is the controlling element in their selection and use. The following is a list of products which are recommended for consideration as "Construction Oak":

I.—Construction Oak.

(A), (B), (C), Cover Maintenance of Way Material.
(D) Locomotive Timbers: Sills, End and Truck Timbers.
(E) Car Timbers: Car Framing, including Upper Framing, Car Sills, Ends and Truck Timbers, Car Decking, Inside Lining.
(F), (G), (H), (I), (J), (K), (L), Cover Maintenance of Way Material.

II.—Standard Defects.

Definition of "Defect."—Fault, Blemish, Mark of Imperfection that will materially injure the strength. Measurements which refer to the diameter of knots or holes should be considered as referring to the mean or average diameter.

II.—(A) Knots.

(1) Sound Knots. A sound knot is one which is solid across its face, and which is as hard as the wood surrounding it; it may be any color and contain checks.
(2) Loose Knots. A loose knot is one not firmly held in place by growth or position.
(3) Pith Knots. A pith knot is a sound knot with a pith hole not more than ¼ in. in diameter in the center.
(4) Rotten Knots. A rotten knot is one that is not sound and not as hard as the wood surrounding it.
(5) Pin Knots. A pin knot is a sound knot not over ¾ in. in diameter.
(6) Standard Knots. A standard knot is a knot not over 2 in. in diameter.
(7) Large Knots. A large knot is a sound knot more than 2 in. in diameter.
(8) Round Knot. A round knot is one which is oval or circular in form.
(9) Spike Knots. A spike knot is one sawn in lengthwise direction. The mean or average width shall be considered in measuring this knot.
(10) Bird Peck. Some bruises apparently caused by bird pecks during the growth process of the timber. Considered no defect.

II.—(B) Worm Defects.

(1) Pin Wormholes. Pin wormholes are very small holes caused by minute insects or worms. These holes usually are not over 1-16 in. in diameter, or smaller, and the wood surrounding them is sound and does not show any evidences of the wormhole having any effect on the wood other than the opening.
(2) Spot Worm Defects. (Also known as Flag Worm Defects) Spot worm defects are caused, like pin wormholes, by minute insects or worms working on the timber during its growth. The size of the hole is about the same as pin wormholes, but the surrounding wood shows a colored spot as evidence of the defect. This spot is usually sound and does not affect the strength of the piece.
(3) Grub Wormholes. Grub wormholes are usually from about ⅛ to 3-16 in. in width and vary in length from about 3-16 in. to 1 in. long, and are caused by grub worms working in the wood.
(4) Wooden Rafting Pinholes. This defect sometimes appears on river timber where it has been rafted and holes bored in the solid wood for tying the timber, and a solid plug or pin driven in the hole, filling it completely. These defects must be treated and considered the same as knot defects. Ordinary metal rafting pin or chain dog hole is considered no defect.

II.—(C) Sap.

Definition of "Sap."—The alburnum of a tree—the exterior part of the wood next to the bark; sap wood not considered a defect.
Sound Heart. The term sound heart is used in these rules whenever heart of piece is split or opened and shows on outside of piece and its condition is sound and solid, not decayed. Openings between annual rings are checks not considered a defect.

II.—(D) Wane.

Wane is bark or lack of wood from any cause on edges of timber.

II.—(E) Shakes.

Definition of "Shakes."—Shakes are splits or checks in timber which usually cause a separation of the wood between the annual rings.
(1) Ring Shakes. Ring shakes are openings between the annual rings usually showing only on the end of the timber.
(2) Through Shakes. Through shakes are shakes which extend between two faces of the timber.
(3) Checks. A small crack in the wood due to seasoning; not considered a defect.

II.—(F) Grain.

Crooked or Cross Grain. Crooked or cross grain is a grain which crosses the piece within a section of 24 in. in running length of the piece. This is only considered a defect in certain smaller sizes of dimension for specific purposes.

II.—(G) Rot.

Any form of decay which may be detected as giving the timber a doty or rotten texture is a rotten defect, including what is commonly known as dry rot. Water stain, or what are sometimes called scalded or burned spots, usually caused by timber lying in the water under certain conditions before it is sawed, and burned spots where the timber is improperly piled green, not considered defects, as it does not affect the strength of the piece.

III.—Standard Names for Construction Oak.

Standard names for Construction Oak timbers; White Oak and Red Oak. Unless specially mentioned, these terms include the following:

White Oak.	Red Oak.
White Oak.	Red Oak.
Burr or Mossy Cup Oak.	Pin Oak.
Rock Oak.	Black Oak.
Post or Iron Oak.	Water Oak.
Overcup.	Willow Oak.
Swamp Post Oak.	Spanish Oak.
Live Oak.	Scarlet Oak.
Chestnut or Tan Bark Oak.	Turkey Oak.
Basket or Cow Oak.	Black Jack or Barn Oak.
Yellow or Chinquapin Oak.	Shingle or Laurel Oak.

Term: Mixed Oak means any kind of oak.

IV.—Standard Specifications for Structural Oak Timbers.

(1) General Requirements. Except as noted, all structural timbers shall be white, to be sound timber and sawed specified sizes; free from defects, such as ring shakes and crooked grain, rotten knots, large knots in groups, rot, dote, or wane in amounts greater than allowed in these specifications.
(2) Boxed Hearts. This class of oak in pieces of 5 by 5 square and larger is what is usually known as boxed hearts. The center of the heart should be boxed as near the center of the piece as practical; and not to exceed 30 per cent of the pieces can have the center of the heart nearer than 1½ in. from any face; 20 per cent may show one heart face, corner or edge, not to exceed 75 per cent of the length of the piece.

IV.—(3) Wane; Explanatory.

The term 20 per cent of number of pieces or amount shipped refers to each item and size of each car shipped.

(a) Pieces 5 by 5 to 8 by 8 square may show 1 in. wane, side measurement on any two corners or edges, and this wane not to exceed more than 25 per cent of the length of the piece singly, or 50 per cent in aggregate. In the absence of wane on all corners excepting one, the one corner can contain wane 50 per cent of the length of the piece as above described; not to exceed 20 per cent of number of pieces may have this defect.

(b) Pieces over 8 by 8, including 12 by 12, square, may show 1½ in. wane, side measurement, edge of any two corners or edges, and this wane not to exceed more than 33⅓ per cent of the length of the piece singly, or 66⅔ per cent in aggregate. In the absence of wane on all corners excepting one, the one corner can contain wane 66⅔ per cent of the length of the piece as above described; not to exceed 20 per cent of number of pieces may have this defect.

(c) Pieces over 12 by 12 square may show 1¾ in. side measurement, any two corners or edges, and this wane not to extend more than 40 per cent of the length of the piece singly, or 80 per cent in aggregate. In the absence of wane on all corners excepting one, the one corner can contain wane 80 per cent of the length of the piece as above described; not to exceed 20 per cent of number of pieces may have this defect.

(d) In event that pieces have two faces as wide as above described and two faces narrower the proportion of the amount of wane is admissible.

(e) Pieces 1 in. to 5 in. thick, not exceeding 8 in. wide, are governed by defect specifications above mentioned, with the exception that they cannot contain wane, and not to exceed 20 per cent of pieces 2 in. and thicker may show sound heart on one face; pieces under 2 in. thick must be free of heart. Pieces 8 in. and wider may contain wane as per paragraphs b and d.

(f) Rough sizes of this structural timber cannot vary more than ¼ in. scant of specified size. Dressed sizes may be ½ in. scant after dressing.

V.—(B) Locomotive Timber Oak. Passenger Car Dimension Oak. Refrigerator Car Dimension Oak.

Thickness cut to order, widths cut to order, lengths cut to order. Unless otherwise noted, must be cut from white oak. This stock, wherever practical, should be cut outside the heart and must be free of heart shake in pieces under 6 by 6 square. No attempt should be made to box the heart in pieces smaller than 5 by 7, unless heart is very small and tight. When heart is well boxed it must be firm and tight, and the center of the heart must not be nearer than 2 in. from any face. Must be sawed full to sizes with square edges, and cut from sound timber and free from wormholes, with the exception of a few small pin wormholes well scattered, and an occasional spot worm. None of these defects, however, to affect the serviceability of the piece for the purpose intended. Must be free from split, rot or dote, large, loose, rotten or unsound knots, or, in other words, free of all defects affecting the strength and durability of the piece. Sound standard knots well scattered not considered a defect.

V.—(C) Freight Car Timbers.

Freight car dimension, including all cars other than refrigerator and passenger car. Sizes cut to order. Unless otherwise ordered, must be sawed from good merchantable white or red oak timber. This stock must be free of rot, shakes and splits, large, loose, rotten or unsound knots, any of which will materially impair the strength and durability of the piece for the purpose intended. This stock is intended to work full size and lengh without waste, for side posts, braces and end sills end plates, draft timbers, cross ties, etc., used in the construction of ordinary freight or stock cars. On pieces 3 by 4 in. or equivalent girth measure and larger (nothing under 2 in. thick), heart check showing on one corner, admitted on 20 per cent of the pieces in each car shipment. Well boxed, sound hearts admitted in this material in pieces 5 by 6 and larger.

On pieces 3 by 4 to 6 by 6, inclusive, or equivalent girth measure and larger (nothing under 2 in. thick), in absence of heart defects, wane on one corner, ¾ in. side measurement, admitted on not to exceed 20 per cent of the number of pieces in each car shipment.

Pieces over 6 by 6 square may contain 1 in. wane, side measurement, on one corner, with other conditions same as 3 by 4 to 6 by 6 sizes.

RECOMMENDED CLASSIFICATION AND GRADING RULES FOR DOUGLAS FIR CAR AND LOCOMOTIVE MATERIAL.

1. The term "Douglas Fir" will cover the timber known likewise as Yellow Fir, Red Fir, Western Fir, Washington Fir, Oregon or Puget Sound Fir or Pine, Northwest and West Coast Fir.

2. Fir Lumber shall be graded and classified according to the following rules and specifications as to quality, and dressed stock shall conform to the subjoined table of standard sizes, except where otherwise expressly stipulated between buyer and seller.

3. Recognized defects in Fir are knots, knotholes, splits, check, wane, rot, rotten streaks, wormholes, dog or picaroon holes, pitch seams, shake, pitch pockets, chipped grain, torn grain, loose grain, solid pitch, stained heart, sap stain and imperfect manufacture.

Knots.

4. Knots shall be classified as pin, small, standard and large, as to size; round and spike as to form, and tight, loose and rotten as to quality.

5. A pin knot is tight and not over ½ in. in diameter.

6. A small knot is tight and not over ¾ in. in diameter.

7. A standard knot is tight and not over 1½ in. in diameter.

8. A large knot is tight and any size over 1½ in. in diameter.

9. A round knot is oval or circular in form.

10. A spike knot is one sawn in a lengthwise direction.

The mean or average diameter of knots shall be considered in applying and construing the rules.

11. A tight knot or sound knot is one solid across its face, is as hard as the wood it is in, and is so fixed by growth or position that it will retain its place in the piece.

12. A loose knot is one not held firmly in place by growth or position.

13. A rotten knot is one not as hard as the wood it is in.

Pitch.

14. Pitch pockets are openings between the grain of the wood, containing more or less pitch and surrounded by sound grain wood; they shall be classified as small, standard and large pitch pockets.

15. A small pitch pocket is one not over ⅛ in. wide.

16. A standard pitch pocket is one not over ⅜ in. wide or 3 in. in length.

17. A large pitch pocket is one over ⅜ in. wide or over 3 in. in length.

18. A pitch shake or seam is a clearly defined opening between the grain of the wood and may be either filled with granulated pitch or not, but in either case is considered a defect in any of the grades hereinafter described.

19. A pitch streak is a well-defined accumulation of pitch at one point in the piece, and when not sufficient to develop a well-defined streak, or where fiber between grains is not saturated with pitch it shall not be considered a defect.

20. A small pitch streak shall be equivalent to not over one-twelfth the width and one-sixth the length of the piece it is in.

21. A standard pitch streak shall be equivalent to not over one-sixth the width and one-third of the length of the piece it is in.

Wane.

22. Wane is bark, or the lack of wood, from any cause on edge.

Sap.

23. Bright sap shall not be considered a defect in any of the grades, provided for and described in these rules, except where stipulated.

24. Sap stain shall not be considered a defect, except as provided herein.

25. Discoloration of the heart of the wood, or stained heart, must not be confounded with rot or rotten streaks. The presence of rot is indicated by decided softness of the wood where it is discolored, or by small white spots resembling pin wormholes.

Miscellaneous.

26. Defects in rough stock caused by improper manufacture and drying will reduce grade, unless they can be removed in dressing such stock to standard sizes.

27. All stock, except car sills and framing, shall be inspected on the face side to determine the grade. Stock surfaced one side, the dressed surface shall be considered the face side. Stock rough or dressed two sides, the best side shall be considered the face, but the reverse side of all such stock shall not be more than one grade lower.

28. Chipped grain consists in a part of the surface being chipped or broken out in small particles below the line of the cut, and as usually found should not be classed as torn grain, and shall be considered a defect only when it unfits the piece for use intended.

29. Torn grain consists of a part of the wood being torn out in dressing. It occurs around knots and curly places, and is of four distinct characters—slight, medium, heavy and deep.

30. Slight torn grain should not exceed 1-32 in. in depth; medium 1-16 in. and heavy ⅛ in. Any torn grain heavier than ⅛ in. shall be termed deep.

31. Loosened grain consists in a point of one grain being torn loose from the next grain. It occurs on the heart side of the piece and is a serious defect, especially in flooring.

32. The grade of all regular stock shall be determined by the number, character and position of the defects visible in any piece. The enumerated defects herein described admissible in any grade are intended to be descriptive of the coarsest piece such grades may contain, but the average quality of the grade should be midway between the highest and lowest pieces allowed in the grade.

33. Lumber and timber sawed for specific purposes must be inspected with a view to its adaptability for the use intended.

34. All dressed stock shall be measured strip count, viz., full size of rough material necessarily used in its manufacture.

35. Equivalent means equal, and in construing and applying thse rules, the defects allowed, whether specified or not, are understood to be equivalent in damaging effect to those mentioned applying to stock under consideration.

36. Lumber must be accepted on grade in the form in which it was shipped. Any subsequent change in manufacture or millwork will prohibit an inspection for the adjustment of claims, except with the consent of all parties interested.

37. The foregoing general observation shall apply to and govern the application of the following rules:

The rules referred to under Sections 38, 39 and 40 govern 4-in or 6-in. strips, and are intended to cover strips used for car siding, car roofing and car lining.

The term "Edge Grain" is here used as synonymous with vertical grain, rift-sawn, or quarter-sawed. The term "Flat Grain" is synonymous with slash grain or plain sawed.

No. 2 Clear and Better Edge Grain.

38. Material of this grade shall be well manufactured with angle of grain not less than forty-five degrees. This stock shall be kiln dried and practically free from all defects, but will admit of bright sap on the face; not exceeding three small close pitch pockets not over 2 in. long, one pin knot, slight roughness in dressing, but not a serious combination of these defects.

No. 2 Clear and Better Flat Grain.

39. Material of this grade shall be well manufactured. The stock shall be kiln-dried and practically free from all defects, but will admit of bright sap on the face; not exceeding three small close pitch pockets not over 2 in. long, one pin knot, slight roughness in dressing, but not a serious combination of these defects.

No. 3 Clear.

40. Material of this grade should be sound common lumber and will admit of roughness in dressing, bright sap, and also may contain five pin three small and one standard knot and five pitch pockets in any continuous 5 feet of length of the piece; or any combination of tight knots or pitch pockets equivalent to those mentioned above. This grade particularly refers to stock used for inside lining of freight cars.

Standard Car Decking or Flooring.

41. Stock in this grade shall be well manufactured from sound, live timber and shall be free from splits, shakes, rot, bark or waney edges, and unsound knots, or pitch pockets, pitch seams or large knots which would weaken the piece for the use intended. This grade will admit of sound knots not to exceed one-third width of the piece, provided they are not in clusters, and sap.

Common Car Sills and Framing.

42. Stock in this grade shall be well manufactured from sound live timber, sawed full size to sizes ordered and free from rot, unsound knots, cross grain, bark or waney edges or shakes, but will admit of sap and any number of sound knots, provided they are not in clusters, and do not exceed one-third width of piece; pitch pockets or pitch seams that would not weaken the piece for the purpose intended.

43. Sizes up to 6 in. in width shall measure full when green, and not more than ⅛ in. scant when dry or part dry. Sizes 6 to 12 in. in width shall measure full when green and not more than ¼ in. scant when dry or part dry. Sizes 12 to 16 in. in width shall measure full when green and not more than ⅜ in. scant when dry or part dry. Unless otherwise specified, ¼ in. shall be allowed for each side which is to be dressed. Where stock is wanted dressed smooth all four sides, timber shall be sawed ½ in. full over the dressed sizes required. In pieces 3 by 6 in. and under when ordered in lengths exceeding 30 feet, sound knots shall not exceed one-quarter the width of the face through which they project, and the grain shall not cross sufficient to impair the strength.

44. Standard Lengths.

Car Sidings.—8, 9, 10 and 12 feet or multiples.

Car Roofing.—5 feet or multiples.

Car Lining.—8, 9, 10, 12, 14, 16, 18 and 20 feet or multiples.

Car Decking.—9 or 10 feet or multiples.

All orders shall be shipped in the standard length called for, unless otherwise specified, but no lengths of either car siding, lining or roofing shall be shipped, except in the lengths specified or multiples thereof. Those who do not desire stock shipped in multiple lengths should so specify.

RECOMMENDED CLASSIFICATION AND GRADING RULES FOR CYPRESS CAR MATERIAL.

1. Cypress to include Red Cypress, Gulf Cypress, Yellow and East Coast Cypress, also known as Bald Cypress.

2. Cypress Lumber shall be graded and classified according to the following rules and specifications as to quality, and dressed stock shall conform to the subjoined table of standard sizes, except where otherwise expressly stipulated between buyer and seller.

3. Recognized defects in Cypress are knots, knotholes, sap, wormholes, shake, season checks, splits and wane.

Knots.

4. Knots shall be classified as standard and small, as to size, and sound or rotten, as to quality.

5. A standard knot is sound and not to exceed 1¼ in. in diameter.

6. A small knot is one not exceeding ¾ in. in diameter.

7. A sound knot is one solid across its face, is as hard as the wood it is in, and is so fixed by growth or position that it will retain its place in the piece.

8. A rotten knot is one not as hard as the wood it is in.

Sap.

9. Stained sap or bright sap shall not be considered a defect in the material specified in these rules.

Season Checks.

10. Ordinary season checks are such as occur in lumber properly covered on yard or season checks of equal size in kiln-dried lumber.

Wane.

11. Wane is bark or lack of wood from any cause on edge.

Miscellaneous.

12. The grade of all regular stock shall be determined by the number, character and position of the defects visible in any piece. The enumerated defects herein described admissible in any grade are intended to be descriptive of the coarsest pieces such grades may contain, but the average quality of the grade shall be midway between the highest and lowest pieces allowed in the grade.

13. Lumber sawed for specific purposes must be inspected with a view to its adaptability for the use intended.

14. All dressed stock shall be measured strip count, viz., full size of rough material necessarily used in its manufacture.

15. Lumber must be accepted on grade in the form in which it was shipped. Any subsequent change in manufacture or millwork will prohibit an inspection for the adjustment of claims, except with the consent of all parties interested.

16. The foregoing general observation shall apply to and govern the application of the following rule. The rule referred to in the following section is intended to govern 4-in. or 6-in. strips and to cover strips used for car siding, car roofing or car lining.

Grading Rule for Cypress Car Roofing, Siding or Lining.

17. Material of this grade shall be well manufactured, and kiln-dried, and will admit of sound knots, any amount of stained sap; very small pin wormholes, such as will readily fill and cover by the usual painting; slight shake; a small split; ordinary season checks; but will not admit of grub wormholes, wane, knotholes, or defects which would prevent the use of each piece in its full width and length for the purpose intended as named above.

18. Standard Lengths.

Car Siding—8, 9, 10 and 12 feet or multiples.

Car Roofing—5 feet or multiples.

Car Lining—8, 9, 14, 16, 18 and 20 feet or multiples.

All orders shall be shipped in the standard lengths called for, unless otherwise specified, but no lengths of either car siding, lining or roofing shall be shipped, except in the lengths specified or multiples thereof. Those who do not desire stock shipped in multiple lengths should so specify.

The report is signed by: G. N. Dow (L. S. & M. S.), chairman; G. H. Gilman (N. P.), and R. W. Burnett (C. P. R.) for the Master Car Builders' Assn., and R. E. Smith (A. C. L.),

and J. F. DeVoy (C. M. & St. P.) for the Master Mechanics' Assn.

T. W. Demarest (Penn. Lines), a member of the Master Mechanics' committee, approves of the report, with the exception of the item of Loblolly pine, referred to under (1) of classification of yellow pine car material and also paragraph 48, with reference to knots in car sills and framing, which should be modified at the convention.

MASTER MECHANICS' REGISTRATION.

Adams, A. C., M. M., N. Y. N. H. & H. R. R.
Aldcorn, Thos., Chicago Pneumatic Tool Co.
Allen, C. W.
Allen, G. S.
Anthony, F. S., S. M., International & Ct. Nor. Ry.
Baker, Horace, G. M., C. N. O. & T. P. Ry., Marlborough-Blenheim Hotel.
Barton, T. F., D. L. & W. R. R., Haddon Hall.
Basford, Geo. M., American Locomotive Co.
Bawden, Wm., M. M., Terminal Assn. of St. Louis.
Beau, S. L., M. S., A. T. & S. F. Ry., Marlborough-Blenheim Hotel.
Bell, J. Snowden, Asst. Member, St. Charles Hotel.
Bentley, H. T., A. S. M. P., C. & N. W. Ry. Marlborough-Blenheim Hotel.
Bingaman, Chas. A., Phila. & Reading Ry.
Black, W. G., M. M., N. Y. C. & St. L. R. R., Chester Inn.
Booth, Jas. K., G. F., B. & L. E. R. R., Monticello Hotel.
Boughton, Wm., G. M. M., Pere Marquette R. R., Traymore Hotel.
Brango, P. H., Dennis Hotel.
Brazier, F. W., Supt. R. S., N. Y. C. & H. R. R. R.
Brown, David, Del. Lack. & Western R. R.
Brown, M. G., M. M., Gulf & Ship Island R. R.
Buchanan, A. Jr., Public Service Commission, Haddon Hall.
Burns, Frank, M. M., St. L. & S. F. Ry.
Burton, T. L., Gen. Insp., C. R. R. of N. J.
Butts, G. W., M. P. Insp., P. R. R., Dennis Hotel.
Carroll, J. T., Supt. M. P., B. & O.
Casey, J. J., Supt., American Car & Fdy. Co.
Chenowith, Edwin G., M. E., Erie R. R.
Chisholm, J. E., Ward Packer Supply Co.
Clark, Jas. H., M. M., Staten Island Rap. Transit Co., Shelburne Hotel.
Cleaver, F. C., S. M. P., Rutland R. R.
Cole, F. J., Amer. Loco. Co., Traymore Hotel.
Connolly, J. J., S. M. P., Duluth So. Shore & Atlantic.
Corey, C. H., Honorary Member.
Coutant, M. R., M. M., Ulster & Del. R. R., Shelburne Hotel.
Cozad, W. S., Shop Specialist, Erie R. R., Schlitz Hotel.
Cromwell, Oliver C., M. E., B. & O. R. R., Shelburne Hotel.
Curtis, Theo. H., S. M., Louisville & Nashville Ry.
Dalton, Wm., Chief Engr., American Loco. Co., Traymore Hotel.
Dawson, L. L., S. M. P., Ft. Worth & Denver.
DeVoy, J. F., A. S. M. P., C. M. & St. P. Ry. Co.
Diehr, C. P., M. M., N. Y. C. & H. R. R. R., Stanley Hotel.
Dillon, S. J., M. M., Penna R. R. Co.
Dooley, Wm. H., M. M., C. N. O. & T. P. Ry.
Dunlap, W. H., M. M., L. & N.
Durham, Geo., M. M., L. & N. R. R.
Elliott, J. B., M. M., Balto. & Ohio R. R., Elberon Hotel.
Endsley, Prof. L. E., Asso. Prof. Ry. Mech. Eng., Purdue University.
Ettenger, R. L., C. M. E., Southern Ry.
Evans, R. C., S. M. P. & C. D., Western Maryland R. R., Pennhurst Hotel.
Ewing, J. J., M. E., Ches. & Ohio Ry. Co.
Flory, B., S. M. P., N. Y. O. & W. R. R.
Fogg, J. W., M. M., Chgo. Ter. Transfer Ry.
Forsyth, Wm., Railroad Age Gazette.
Fowler, George L., Dennis Hotel.
Fuller, C. E., S. M. P., Union Pacic Ry.
Fulmor, John H., M. M., Pennsylvania R. R.
Gaines, F. F., S. M. P., Central of Georgia Ry.
Gill, John, S. M. P., C. I. & L. Ry.
Gilbert, F. M., M. E., N. Y. C. & H. R. R. R. Co., Seaside Hotel.
Goodrich, Geo. P., M. M., Ft. Smith & Western R. R.
Goodrich, Max, M. M., New York & Ottawa R. R. New Holland Hotel.
Gorey, E. H., G. F., Louisville & Nashville R. R.
Gossett, Charles E., M. M., Iowa Central R. R.
Gould, Jos. E., S. M. P., Norfolk & Southern Ry.
Gray, B. H., S. M. P., New Orleans, Mobile & Chicago R. R.
Green, Herbert, Dennis Hotel.
Hale, H. H., M. M., C. H. & D.
Hall, W. H., Chief Car Insp., C. R. R. of N. J.
Hang, Harry, M. M., Brownstone & Middleton Ry.
Harrigan, P. J., M. M., Baltimore & Ohio R. R.
Harrington, H. H., M. M., Erie Ry., Runnymede Hotel.
Harris, C. M., M. M., Washington Terminal R. R.
Hassett, M. W., M. M., N. Y. C. & H. R. R. R., Marlborough-Blenheim Hotel.
Hatz, G. J., Supt. Shops, U. P. Ry.
Hill, John, M. M., Minneapolis & St. Louis Ry.
Hogan, C. H., N. Y. C. & H. R. R. R., Marlborough-Blenheim Hotel.
Hawkins, B. H., D. M. M., D. L. & W. Ry.
Humphrey, A. L., G. M., Westinghouse Air Brake Co., Marlborough-Blenheim Hotel.
Hunter, G. S., Div. M. M., Kansas City Southern Ry.
Hunter, H. S., M. M., Philadelphia & Reading Ry., Worthington Hotel.
James, Charles, M. M., Erie R. R., Schlitz Hotel.
Kapp, W. F., Supt. Shops & Mchy., R. F. & P. Ry.
Kalbaugh, I. N., Coal & Coke Ry.
Kellogg, W. L., M. M., P. M. R. R.
Kells, Willard, M. M., Lehigh Valley R. R.
Kilpatrick, J. B., Asst. S. M. P., C. R. I. & P. Ry.
Kilpatrick, R. F., A. S. M. P., D. & R. G. R. R.
Kinney, M. A., M. M., Hocking Valley Ry.
Kinney, W. H., Genl. Foreman, N. Y. O. & W. Ry., Traymore Hotel.
Kyle, C., M. M., Canadian Pacific Ry., Haddon Hall.
Lane, F. W., London Times, Dennis Hotel.
Leach, H L.
Lockwood, B. D., A. C. E. Pressed Steel Car Co.
Luscombe, J. T., M. M., Toledo & Ohio Central Ry.
McCuen, J. P., S. M. P., C. N. O. & T. P. Ry.
McGill, A. M., M. M., Lehigh Valley R. R.
McGill, A. M., M. M., Lehigh Valley R. R., Traymore Hotel.
McGregor, A. A., M. M., L. & N. R. R.
McLean, W. J., B. B. & B. C. Ry., Dennis Hotel.
McNaughton, Jas., American Locomotive Co.
McNulty, F. M., M. M., Monongahela Connecting R. R.
McRae, G. A., M. E., Mich. Cent.
MacBain, D. R., N. Y. C. & H. R. R. R.
Maher, Peter, S. M. P., T. St. L. & S. W. Ry.
Manchester, A. E, S. M. P., C. M. & St. P. Ry.
Manchester, Henry C., A. S. M. P., Maine Central R. R., Shelburne Hotel.
May, H C., M. M., L. & N.
May, Walter, M. M., C. C. C. & St. L. Ry.
Miller, Geo. A., M. M., Florida East Coast Ry.
Minshull, D. H., M. M., N. Y. O. & W. R. R., Traymore Hotel.
Monkhouse, H., Rome Locomotive Works, Chalfonte Hotel.
Moore, B. R., M. M., G. & S. I. R. R., Traymore Hotel.
Moorehead, L. B., M. E., N. Y. C. & St. L. R. R., Monticello Hotel.
Nicholson, John, S. M. P. & M., St. L. B. & M. Ry.
Noble, L. C., Young's Hotel.
Onderdonk, J. R., B. & O. R. R.
Oplinger, J. W., S. M. P., Atlantic Coast Line R. R., Marlborough-Blenheim Hotel.
Oviatt, H. C., M. M., N. Y. N. H. & H. R. R.
Owens, Wm., M. M., L. V. R. R., Dennis Hotel.
Painter, J. H., M. M., A. C. L. R. R., Chalfonte Hotel.
Parish, Le Grand, L. S. & M. S. Ry., Marlborough-Blenheim Hotel.
Park, S. T., S. M. P., C. & E. I. Ry
Passmore, H E., M. M., T. & O. C. Ry.
Patterson, J. S., Galena Oil Co.
Paxton, Thos., S. M. P., E. P. & S. W. Ry.
Prendergast, A. P., M. M., B. & O. R. R., Shelburne Hotel.
Phillips, C., M. M., N. O. & N. E., & A. V. Rys.
Platt, John G.
Powers, M. J., M. M., Denver & Rio Grande R. R.
Prendergast, A. P., M. M., Baltimore & Ohio R. R.
Prendergast, Jas. L., M. M., Baltimore & Ohio Ry.
Prescott, C. H., Spokane International Ry.
Quigley, Joseph, M. M., C. N. O. & T. P. Ry., Dennis Hotel.
Rae, Clark H., G. M. M., Louisville & Nashville R. R.
Reid, W. L., Supt., American Locomotive Co.
Ridgway, H. W., M. M., Colorado & Southern Ry.
Riley, Geo. N., National Tube Co.
Rink, Geo. W., M. E., C. R. R. of N. J.
Roberts, Joseph, M. M., Union Pacific R. R. Co.
Robertson, D. D., M. M., L. V. R. R., Traymore Hotel.
Rollings, E. O., M. M., L. & N.
Roth, H. L., Q. & C. R. R., Chalfonte Hotel.
Rowland, W. I., M. M., B. & O. R. R., Cornell Hotel.
Schlafge, William, M. M., Erie R. R., Schlitz Hotel.
Scheffer, F. H., Supt. Mchy., N. C. & St. L. Ry., Runnymede Hotel.
Schmidt, Prof. E. C., University of Illinois.

Seddon, C. W., S. M. P. & C., D. M. & N. Ry.
Sedgwick, E. V., Galena Signal Oil Co., Young's Hotel.
Seley, C. A., M. E., C. R. I. & P. Ry.
Seidel, G. W., Supt. Silves Shops, C. R. I. & P. Ry., Marlborough-Blenheim Hotel.
Seidel, G. W., Dennis Hotel.
Smith, E. J., M. M., Atlantic Coast Line R. R., Windsor Hotel.
Smith, F. C., American Locomotive Co., Traymore Hotel.
Smith, R D., A. S. M. P., N. Y. Central Lines.
Smith, W. T., S. M. P., Chesapeake & Ohio Ry. Co.
Stearns, W. A., M. E., Louisville & Nashville R. R.
Stewart, A. F., M. M., Chesapeake & Ohio Ry.
Stewart, C. J., M. M., Central New England R. R., Chalfonte Hotel.
Stocks, W. H., Chalfonte Hotel.
Stuart, Charles M., M. M., Philadelphia & Reading R. R.
Summerskill, T. A.
Sweeley, E. H., G. F. L. R., Long Island R. R., Windsor Hotel.
Swoyer, H., M. M., Rogers Locomotive Works, Traymore Hotel.
Symington, T. H.
Talty, J. A., Traveling Engrs.' Assn., Haddon Hall.
Taylor, G. W., S. M. P., S. A. & A. P. Ry.
Taylor, Joseph W., Secy., A. R. M. M. Assn.
Taylor, Wm. H., M. M., N. Y. S. & W. R. R. Co., Schlitz Hotel.
Terrell, C. H., M. M., Chesapeake & Ohio Ry.
Thomas, Frank W., Supervisor of Apprentices, A. T. & S. F. Ry., Marlborough-Blenheim Hotel.
Thomas, W. H.
Thompson, W. O., M. C. B., N. Y. C. & H. R. R. R.
Tollerton, W. J., A. G. S. M. P., C. R. I. & P. Ry., Marlborough-Blenheim Hotel.
Turner, J. S., Sales Agent, Pressed Steel Car Co.
Van Valin, H. D., D. M. M., B. & O. R. R.
Wahlen, John, M. M., Montpelier & Wells River R. R.
Walsh, F. O., M. M., Atlanta & West Point Ry.
Walsh, J. F., S. M. P., C. & O. R. R.
Waters, J. J., Supt. Mech. Dept., Mexican Central R. R., Marlborough-Blenheim Hotel.
Watson, R. B., Engr. of Tests, Erie R. R.
Watson, Samuel, M. M., N. Y. C. & H. R. R. R.
Whyte, F. M., M. E., N. Y. C. & H. R. R. R.
Wieseckel, Geo. F., M. M., B. & O. R. R.
Wildin, G. W., Mech. Supt., N. Y. C. & H. R. R. R.
Williams, E. V., G. F., N. Y. C. & H. R. R. R., Stanley Hotel.
Wright, R. V.
Wyman, R. L., M. M., Lehigh & New England R. R.
Young, C. B., M. E., C. B. & Q. R. R.
Young, Charles D., A. E. M. P., Pa. Lines West.

MASTER MECHANICS' GUESTS.

Alexander, J. R., Gen. Road For. of Engines, P. R. R.
Andrews, D., Foreman Mach. Shop, B. & O. R. R.
Anderson, H. A., Spec. Agt, Pur. Dept., P. R. R.
Best, J. I., Ch. Cl. S. M. P., P. & R.
Bender, E. N., Gen. Pur. Agt., C. R. R.
Cain, Chas., P. R. R.
Connelly, W. J., Ch. Electrician, C. & O.
Connolly, W. J., C. & O. R. R.
Creighton, J. H., Rodman, M. W. Dept., P. R. R.
Curran, D. D., Pres., N. O. & N. E., & A. V. Rys.
Davies, H. W., Pur. Agt., Norfolk & Southern Ry.
Demarest, Geo. L., Ch. Clerk to Supt. of Shops, C. R. R. of N. J.
Dollar, Geo., Car Inspector, N. Y. C.
Dunphy, H. I., Secy., G. P. A., N. Y. Cen. Lines, Marlborough-Blenheim Hotel.
Farrell, J. F., Purchasing Agt., Mich. Central.
Farrington, R. J., Gen. Piece Work For., P. & R.
Finney, H. R., Asst. R. F. of E., Penna. R. R.
Fox, G. P., Genl. Foreman, N. Y. C. & H. R. R. R.
Frauenthal, B. W., Secy., St. Louis Ry. Club.
Frazier, Geo. H., Secy., N. E. Ry. Club.
Fuhrer, W., Purchasing Agt., Interboro R. T. Co.
Fuss, C. O., For. Pas. Car Shops, C. R. R. of N. J.
Fuss, I. R., Stenographer, C. R. R. of N. J.
Gallagher, B. F., Foreman, B. & O. R. R.
Gethins, Jas. F., Foreman, Del. & Hudson.
Goodwin, Geo. M., C. D., C. R. I. & P. Ry.
Gossler, Geo. S., Erecting Foreman, P. & R.
Hankins, Louis, C. C. Statistical Bureau, W. J. & S. S. R. R.
Harrold, J. W., C. C. Agent, W. J. & S. S. R. R.
Heddon, G., Asst. Rd. For. of Engines, Penna. R. R.
Hinkins, E. H., B. & O. R. R.
Hornig, E O., Ch. Cl. to G. P. A., N. Y. Cen. Lines, Shelburne Hotel.
Huntington, C. C., Genl. Storekeeper, Lehigh Valley.
Jackson, W. S., Super. Track & Line, Atl. City & Sh. Line.
Jones, E., Gen. For. Freight Car Dept., D. H.
Keegan, Geo., Asst. to V. P., Interboro R. T. Co., Marlborough-Blenheim Hotel.
Kniseley, H. S., Car Inspector, N. Y. C.
Koch, Philip, Genl. Foreman Car Shops, C. R. R. of N. J.
Landon, W. B., Chemist, Erie R. R.
Laugley, C. E., Southern Ry.
Lum, W. D., Cl. Ind. Dept., St. L. & S. F. R. R.
McSweeney, J. T., G. F., B. & O. R. R.
Macklin, H. C., Pur. Agt., Seaboard Air Line.
Micklin, H. H.
Mathes, S. R., M. M., Nor. & So. Ry.
Maurer, W. R., Mech. Eng., N. Y. N. H. & H.
Merrill, A. J., Sec., Southern Ry. Club.
Mitchell, A. G., Supt., P. R. R.
Neal, J. H., Nor. & So. Ry.
O'Brien, J. D., Mch. Shop Foreman, L. & N. R. R.
Parks, F. R., Award Clerk, Panama Commission.
Paschal, M. V., Foreman, B. & O. R. R.
Roberts, Roy, M. M., N. P. R. R.
Rogers, J. W., Elect. Supervisor, West J. & Seashore.
Ryan, P. H., C. C. M. P. Dept., N. Y. C. Lines.
Sloan, J. R., Genl. Electrician, P. R. R.
Smith, M., Asst. Pur. Agt., P. R. R.
Snyder, J. Campbell, Ch. Cl. Pur. Dept., N. Y. C. & H. R. R. R., Shelburne Hotel.
Street, J. F., M. E., P. A. & McK. R. R. R.
Sweeley, G. P., M. M., Penna. Lines.
Torback, F. S., Gang Foreman, B. & O. R. R.
Morris, Walborn, Asst. Erecting Foreman, P. & R.
Walker, W. A., B. & O. R. R.
Warner, F. R., Foreman, B. & O. R. R.
Weeks, Chas., Storekeeper, P. R. R.
Weiss, F. A., M. Ptr., Cen. R. R. of N. J.
West, Jno. T., P. A., Seaboard Air Line.
Wheatley, E. H., Clerk to Eng. M. of W., L. V. R. R.
White, Ed. S., Foreman Painter, C. R. R. of N. J.
Wight, T. B., Purchasing Agt., N. Y. C. & H. R. R. R.
Williams, Haskins, Foreman Loco. Dept., Ala. Great Southern.
Wortham, E. S., Asst. to V. P., Chicago & Alton, Chalfonte Hotel.
Yoos, Edw. A., Foreman Air Br. Men, C. R. R. of N. J.

A PROPOSITION FROM SARATOGA.

A committee representing the interests of Saratoga, N. Y., has presented to the executive committees of the Master Car Builders' Association and the Railway Supply Manufacturers' Association a proposition looking to the holding of future conventions at that place, and a similar proposition will be presented to the executive committee of the Master Mechanics' Association on Wednesday afternoon. The Saratoga committee consists of C. H. Booth, president United States Hotel Company, and James D. McNulty, president of the village of Saratoga. The latter presented the plan in substance as follows:

"Representing the citizens of Saratoga Springs, I am here to present a proposition which, I believe, will appeal to you and be, if carried into effect, to our mutual interest. The proposition, in substance, is as follows:

"Saratoga Springs will erect a fire-proof building on its principal street and within one thousand feet of the Delaware & Hudson track for meeting and exhibition purposes, to be used by your association, the Master Car Builders' and the American Interurban & Street Railway Association. This building will be within ten minutes' walk of our principal hotels. It will be connected with the Delaware & Hudson, so that exhibits can be placed in any part of the hall direct from the cars or on the cars. It is contemplated in the tentative plans we have prepared to have two floors; the exhibits to be on the lower floor and the meetings of the associations to be held on the second floor. The building will have an exhibition space of upwards of 100,000 sq. ft., and be located on a plot of ground comprising twelve acres. This is simply an outline of the proposed building, and we will construct it on plans which may be prepared or approved by you.

"The price for exhibition purposes in this building and to cover all expenses for use and occupancy will be 30 cents per sq. ft., it being understood that all associations will use 140,000 sq. ft. each year, and that the three associations, the Master Car Builders' and Master Mechanics', and the American Interurban & Street Railway Association, will meet in this building three times during the next five years, at the end of which time these associations will practically own the building.

"We propose to form an association which will construct a building and from the revenue derived from the 30 cents per sq. ft. for exhibition purposes during three years out of five, pay for the same and give it to the association.

"Now, since you have last met in Saratoga Springs, the hotel accommodations have been improved materially, and I believe you will find the town more attractive than ever before, and Saratogians, should you come there, will do all they can to make your stay pleasant and comfortable. We will establish in connection with this building a bureau of complaints, through which everything will be adjusted to your satisfaction.

"The hotel rates we guarantee as follows (I have reference now to maximum rates): For room and board all over the hotel $5 a day to each person; with bath $2 extra per day; that is, for one person $7, and for two persons $12 with bath. Private parlors and cottages will be furnished for $10 a day.

"Now in conclusion, I wish to thank you for the privilege of appearing before you to-day and assure you that should you come to Saratoga Springs under this proposed plan, you will be heartily welcomed and everything done, as I said before, to make your stay comfortable."

Mr. McNulty filed with the secretary a formal statement of the proposal as above outlined, and the plan will have the consideration of the several executive committees during the coming year.

E. L. Adreon,
President.

B. E. D. Stafford,
Vice-President.

Charles P. Storrs,
Treasruer.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION ANNUAL MEETING.

The annual meeting of the Railway Supply Manufacturers' Association was held in convention hall, on the Million Dollar Pier, at 11 o'clock Saturday morning.

President Grove called the meeting to order. The minutes of the annual meeting held June 19, 1909, were read by the secretary and approved by the meeting.

President Grove then introduced Mayor Stoy of Atlantic City, who made an interesting address of welcome, and presented the freedom of the city to the association. In his remarks, the mayor said that, owing to the strenuosity of his duties during the ten days of this convention, he found it necessary to appoint an assistant Night Mayor, and conferred this honor upon Thomas Aldcorn of New York City, the retiring treasurer.

The report of the committee appointed last year to revise the constitution and by-laws was adopted section by section and as a whole, except that article six was amended. Comment on this will be found in another column.

The reports of the meetings of the district committees were then read and approved.

The following officers were elected:

President, E. L. Adreon, American Brake Company, St. Louis, Mo.

Vice-President, B. E. D. Stafford, Flannery Bolt Company, Pittsburgh, Pa.

Treasurer, Charles P. Storrs, Storrs Mica Company, Owego, N. Y.

Mr. Whipple, chairman of the badge committee, presented Mr. Grove with a retiring president's badge. A vote of thanks was tendered Mr. Grove for his untiring efforts during the past year.

A resolution instructing the executive committee, through its proper officers, to invite those identified with the engineering department of the United States navy to attend these conventions and look over the exhibits, was offered by George A. Post and adopted. Mr. Post explained that the exhibits included much, more especially machine tools, of educational value to the navy department.

D. M. Brady asked thata vote of thanks be tendered the executive committee for the good work it had done. The motion was carried by a rising vote.

CORNELL DINNER.

Cornellians attending the conventions gathered at the Hotel Chelsea on Saturday evening for their fifth annual dinner. It proved to be one of the most enjoyable of the series. Former Professor Barr, now a trustee of the University, came to Atlantic City especially to attend this gathering and gave a most interesting talk on the present and future plans for coping with the greater responsibilities that Cornell is being forced to assume. Other speakers included E. H. Sibley, J. F. DeVoy and J. H. Klinck.

The musical part of the program was of unusual quality, for which the thanks of those present were extended to Mr. Thomas.

F. F. Gaines, superintendent motive power of the Central of Georgia, presided, and R. L. Gordon, assistant to the president of the Standard Steel Car Company, was elected to preside at the next meeting.

The others present were: E. H. Sibley, '80, treasurer Galena Oil Company; J. H. Barr, '89, Smith-Premier Typewriter Company; L. A. Shepard, '92, Titan Steel Castings Company; J. F. DeVoy, '88, assistant S. M. P., C. M. & St. P. Ry.; B. P. Flory, '95, S. M. P., N. Y. O. & W. Ry.; J. S. Goddard, '94, American Steel Foundries; J. H. Mitchell, '96, Pressed Steel Car Company; N. S. Reeder, '96, Canadian Car Company; J. H. Klinck, '94, Westinghouse Electric & Manufacturing Company; C. E. Barry, '96, General Electric Company; W. O. Kellogg, '96, General Electric Company; H. C. Mode, '97, Westinghouse Electric & Manufacturing Company; A. R. Ayres, '00, M. E., L. S. & M. S. Ry.; H. G. Macdonald, '00, Standard Steel Car Company; E. A. Averill, '00, *American Engineer and Railroad Journal;* J. D. Ristine, '04, Union Draft Gear Company; R. S. Cooper, '03, Independent Pneumatic Tool Company; Arthur S. Lewis, '03, Standard Paint Company; H. A. Rogers, '03, Woven Steel Hose & Rubber Company; L. H. Snyder, '06, Joseph Dixon Crucible Company; H. H. Gilbert, '07, Scully Steel & Iron Company; R. F. Stillman, '07, Watson-Stillman Company; E. A. Stillman, '08, Watson-Stillman Company; J. A. Pollak, '07, Block-Pollak Iron Company; R. F. Fowler, '08, Heywood Bros. & Wakefield Company; J. H. Thomas, honorary, Standard Paint Company.

THE ANNUAL BALL GAME.

[REPRINTED FROM THE SPECIAL EDITION OF THE "DAILY RAILWAY AGE GAZETTE" OF JUNE 19.]

East decisively beat West yesterday in the ball game which is an annual entertainment feature at the Mechanical Conventions. The score was 15 to 0.

The Eastern team ran like an 18-hour train engine. The Western team, on the other hand, bucked badly almost from the start; its wheels whirled fast enough, but either the parts of the engine had not been well assembled or the track sadly needed sanding and the Westerners hadn't the needed sand.

A ball game is better than any other kind, from the pea under the thimble, which is psychological, to Halley's daring comet; all good, but the betweens are the best: Billiards, bowling, racquets, cricket, tennis, foot-ball and, best of all, the great, enduring, American team play, base ball.

That is what the convention visitors evidently thought about it, too, and they turned out for the game to the number of several hundreds. As our country newspaper contemporaries say, "a pleasant time was had"—by the Easterners.

Society decorated the great occasion in a spotty way, some here, some there, beaming gladness everywhere. For ornament, extruded metals in great variety of intricate design;" for transportation every way not forbidden by the new Rate Law. The Murphys walked in from Absecon. The Standard Heights and Exhaust Nozzles motored over from the pier. There were toothpick indications of luxurious midday dinners. Al fresco chewing gum luncheon parties were all over the grass, and instantaneous exposures of plate and porcelain gave color to these throngs of society leaders. The boys' evening salvage of scrap amounted to seven kilos of tutti-frutti and dentine—rated as seconds.

The afternoon's festival began when the procession left the Million Dollar Pier at 2.15 o'clock. It was personally conducted by Leonard J. Hibbard, chairman of the base ball committee, and headed by an escort of Atlantic City's fliest cops. Then came the Old Guard band, playing its very best repertoire of marches. The regular musicians were assisted by the rendition of two of them, a recruit in the person of Chairman Johnson, of the Entertainment Committee, who got a taste for tooting in the good old days when he used to pull the whistle of a locomotive, and who now occasionally gratifies the taste by tooting a solo cornet. And, really, he doesn't do it more than half badly.

The eighteen Score Girl mascots, nine representing the East and nine the West, and all chaperoned by Mrs. J. Will Johnson, followed the band, marching two abreast, the first two being the mascots of the Eastern team and the next two of the Western team, and next two of the Eastern, etc. And a group of rosy-cheeked, wholesome and graceful beauty they made, in their dainty white caps and sweaters, tooting jauntily and, more or less, melodiously the megaphones with which all were provided. Each of the Eastern Score Girls wore a red letter "E" on her left sleeve, and each of the Western girls a blue letter "W" on her left sleeve. These letters corresponded in color to those on the uniforms of the players.

The Score Card girls were the following:

East—Mrs. Maud W. Sellers, Montgomery, Ala.; Mrs. R. H. Weatherly, Brooklyn, N. Y.; Mrs. F. O. Walsh, Montgomery, Ala.; Miss Edith May Tewkesbury, Buffalo, N. Y.; Mrs. C. L. Jacobs, Emporia, Kan.; Miss Mabel Brazier, Yonkers, N. Y.; Mrs. R. W. Burnett, Montreal, Canada; Mrs. A. L. Whipple, New York; Mrs. Arthur C. Langston, Columbia, Tenn.

West—Miss Helen M. Little, Minneapolis, Minn.; Miss May Logan, Chicago; Miss Edna H. Fowler, Denver, Col.; Miss Elizabeth MaGraw, Chicago; Mrs. Stanley Wheeler Midgley, Chicago; Miss Allene P. Moran, Louisville, Ky.; Miss Helen Lois Grove, Pittsburgh, Pa.; Miss Jean C. Lindstrom, Pittsburgh, Pa.; Mrs. L. R. Phillips, Chicago.

The Score Girls were followed by the Eastern base ball team, in white uniforms, and the Western team, in gray.

The rest of the procession was made up of intending spectators and innocent bystanders.

At South Carolina avenue the Entertainment Committee had provided fourteen special street cars for all persons wearing badges. The crowd quickly filled them, and was taken to the Pennsylvania Railroad Company's Inlet Park base ball grounds, where the game was played.

The members of the teams all looked like real base ball players until the playing began—and some of them looked that way after it began.

The uniforms were dressy but well designed for serious work. All were equipped with double body bolsters in front and double coil nest springs behind. These were designed to give zest to collisions and a ricochet effect in sliding bases. It was anticipated that a base runner might with skill and some experience land on his nest springs and bound entirely over the basemen at the terminals.

Coke racks were provided for the fielders, so they could hold anything. The grab irons for day coaches, on the side lines, were neat and effective. The umpire, Mr. Passmore, had old-fashioned straight air equipment, and a thermostat to keep him from getting hot about anything. He was well cared for in the matter of body braces, side bearings, outside transoms and all standard appliances for the protection of trainmen.

The flip of a coin by Mr. Hibbard sent the Eastern team to bat.

THE GAME.

It began so nicely, with 9 Western men and only one Eastern player in sight. It looked one sided. The Pressed Steel Car Company (Mr. Hammond) was nearest to me. His head was protected by a basket rack and in his left hand was a receptive Janney coupler. His deck sashes threw a glad light on his head linings as he peered under the National Boiler Washer Company (Mr. Gilman's) elbow, and wig-

wagged signals with his M. C. B. knuckle to the Union Draft Gear Company (Mr. Tarelton). It was fierce, the equipment of the near end, the end all, the statics, the buffer stop, the Gibraltar.

But it was the pitcher, the Union Draft Gear Company (Mr. Tarelton), in the stage center, more simply clad in Diamond S' brake shoes, that held our attention. His the dynamics. In action, a bewildering picture, a highly agitated three-position semaphore. The ball curved from him in the path of a whiplash, recalling Lord Cheltenham's speech in the British Parliament, when he said of Lord Morris: "He is so full of guile, of turns and twists, that if he swallowed a nail it would become a corkscrew."

It did not seem possible to hit such a ball properly, but Mr. Gilman thought differently—being from the West. He lifted the first crack out of the box, the pitcher's box, far down the left field where the Flannery Bolt Company had Mr. Wilson on exhibition. Mr. Wilson moved not at all. He did not need to do so, for when the ball came to his hands he returned it and Mr. Gilman sat down. Jenkins Bros., per William Murray, then safely placed a short fly beyond second. Nobody tried to stop him at first, and he made a brave attempt to steal second. He would have succeeded if he had been a ten second man. By a good catcher's throw and perfect handling by the Pennsylvania Lines West (Mr. La Mar) Jenkins Bros. sphere of influence was shrunk at second. The New Haven R. R. (Mr. Oviatt) then singled to right and stole second, but died there, because, under the Sherman act, the Baltimore & Ohio could not conspire. The B. & O. (Mr. Jeffery) bunted twice unsuccessfully and then grounded out to pitcher and first base. No runs.

The field was now cream white, with only one pearl gray uniform, the Union Draft Gear Company (Mr. Tarelton), who whaled an unduly long left field fly to the near monopolists, Manning, Maxwell & Moore (Mr. Dowling), who missed a difficult catch. Mr. Allen, who honors C. H. Besly & Company with his name, grounded to Mr. Jeffery, who threw him out at first. The Pennsylvania R. R. (Mr. La Mar) then foul-tipped to a grand stand lady with an E on her left arm. This embarrassed the traditionally polite Pennsylvanian so much that he struck out with courteous zeal. It is common rumor that the Curtain Supply Company is willing to sell goods to the B. & O. Mr. Midgley may or may not have heard this rumor; nevertheless he lifted an undirigible foul far beyond third and gave Mr. Beaumont the chance of his life. It was a magnificent running catch. No runs.

Second Inning.

Mr. Dowling grounded to the pitcher, who made a bad throw to first. Beaumont then ran for him, stole second and arrived at his terminal a little later. William Sellers & Company's exhibit (Mr. Enright) then got first on baseman's error, stole second, and the Griffin Car Wheel Company (Mr. Stevenson) made a great drive to the center field fence, bringing in two runs. This was the turning point in the game. Evidently something was expected from Stevenson.

"Two thousand eyes were on him,
When he rubbed his hands in dirt,
One thousand tongues applauded,
While he wiped them on his shirt."
Two hundred chews of gum fell out,
And slid down a hundred skirts.

It happens that we have data for timing Stevenson's run to second, for when the whack was made I was chatting with Miss Carry Iron (Vestibule Drawbar Company). She screamed and we both dropped our gums. I knelt and recovered them and returned hers to her—to Miss Iron. She

The Score Girls.

Top row, left to right—Mrs. Jacobs, Mrs. Walsh, Miss Magraw, Miss Grove, Mrs. Whipple, Mrs. Sellers, Miss Logan, Miss Brazier. Bottom row, left to right—Mrs. Weatherly, Mrs. Burnett, Miss Lindstrom, Miss Little, Mrs. Phillips, Miss Tewkesbury, Mrs. Langston, Miss Moran, Mrs. Midgley, Miss Fowler.

prized it because her mother had given it to her, and she was thanking me profusely when Mr. Stevenson struck second; so it is clear that his time was well within nine seconds, call it eight and two-fifths. The Globe Chemical Company, (Mr. Clancy), died at first because the Curtain Supply Company's Mr. Midgley made a clean pick up and throw. Our attention was again called to B. & O. preferred, when Mr. Beaumont made a line drive over second, scoring Stevenson. He stole second, stole third and scored when the catcher tried to trap him at third—all this at intervals while the mighty Gilman was striking out and Murray was advertising C. H. Besley by giving Mr. Allen a chance to catch his fly ball. Four runs.

The gentlemen from the West went out in 1, 2, 3 order. Mr. Hammond bunted and nearly, but not quite, beat it to first. Mr. Goodnow gave an easy pop fly to the second baseman and Mr. Downing struck out.

Eastern Team.

Top row, left to right—Passmore, Oviatt, Stevenson, Dowling, Jones, Murray, Gilman, Cade. Bottom row, left to right—Clancy, Jeffery, Martin, Hibbard, Enright, Beaumont.

Third Inning.

Beaumont, full of honors, and hopes, came to the coachers box at 3d, and Oviatt batting, scared the life out of him with a line foul which nearly cut off his head. Beaumont handily turned a somersault, and then Oviatt lined safely between center and left. Jeffery tried to bunt, but Allen caught the fly and threw to Downing who dropped the ball and so failed to get a double. Mr. Dowling then violated the Inter-state Commerce law by accepting a free pass. No good came of it, however, for Mr. Enright struck out and Mr. Stevenson grounded to the pitcher who threw to first. No runs. Mr. Sharp, on behalf of the Armour Car Lines, struck out. The Flannery Bolt Company, Mr. Wilson, then, after making a flirtation foul to an Eastern lady in the grand stand, made a terrific drive to left, but Beaumont put 95 pounds avoirdupois and 1,000 pounds of energy in the game and held the Flannery bolt. It was great. Carry, I mean Miss Iron, burst into tears of joy and rested her head on—but then there was another distraction for the National Boiler Washer, Mr. Gilman, was traversing space like a comet, and gathering Tarelton's long heavier-than-air balloon in his halo. No runs.

Fourth Inning.

Clancy sent a weak grounder to the pitcher, who threw him out at first. Beaumont struck out, so the umpire said, and kicked so decently and confidently that we all cheered him. Miss Iron cried a little and said the umpire was a robber. Gilman scratched to first and Murray gave the pitcher a nice high fly to hold. No runs. Allen made a fierce grounder toward shortstop, and here was an instance of fine team play: Beaumont made a great dash and running pick-up with Jeffery backing him up—an insured out at first. LaMar unsuccessfully bunted and Midgley was thrown out at first by Jeffery. No. runs.

Fifth Inning.

Oviatt was gladly hit by the pitcher, and Jeffery struck out. The shortstop made a wild throw of Dowling's grounder and Enright bunted safely. With the bases full the mighty Stevenson made a deep center drive, bringing in two runs and establishing temporary hindquarters at second. Clancy's scratch hit was the result of throwing the ball around a good deal in the hope of catching somebody. In the mixup, Enright scored. Beaumont made a long sacrifice fly to center and Stevenson scored. Gilman made a single, extended by courtesy to a double, and Clancy came home. Martin, taking Oviatt's place, singled, but Gilman was caught between bases. Five runs.

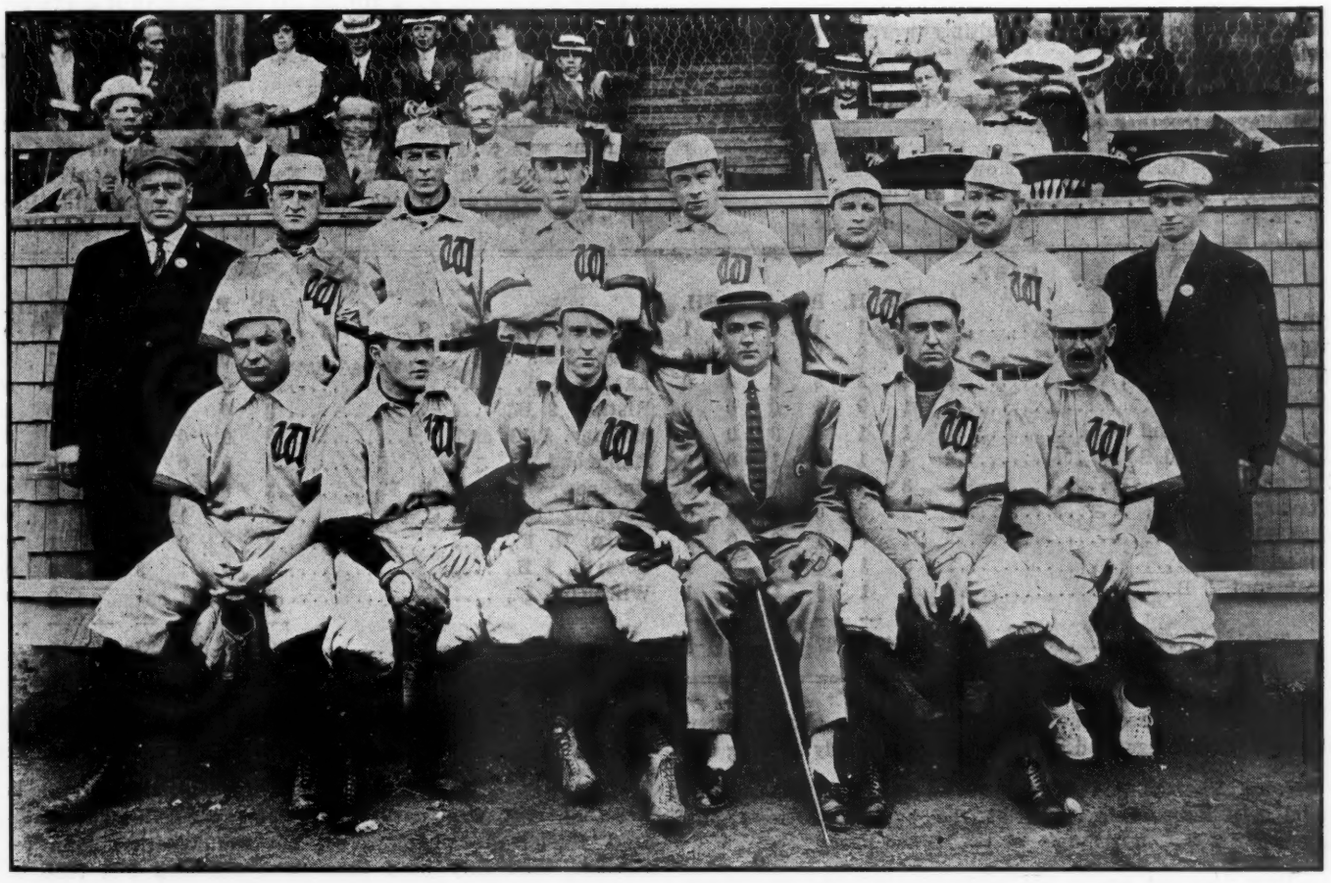
The effete East now made some changes: Jeffery pitcher, Dowling to short, Jones in place of left fielder Clancy.

The Western gentlemen finished their half of the fifth inning quite rapidly; Hammond got a pass and stole second, but couldn't pawn it, for Goodnow struck out, Downing died at first and Sharp filed out to Jeffery.

Sixth Inning.

Midgley, shortstop, changed places with Tarelton, pitcher. Murray and Martin singled. While the Western gentlemen were holding an impromptu post-mortem, Mr. Martin strolled to second, but Murray, less alert, was run out. Jeffery flew out to Tarelton. Dowling scratched to first. Enright made a great drive to center, scoring Martin and Dowling. Then we all cheered Tarelton for his running catch of Stevenson's high fly.

The sun seemed to be setting Westerly, for Wilson, Tarelton and Allen went out in an orderly manner.



Western Team.

Top row, left to right—Passmore, Allen, Forsyth, Sharp, Hammond, Downing, La Mar, Cade. Bottom row, left to right—Wilson, Tarelton, Midgley, Hibbard, Ristine, Goodnow.

Seventh Inning.

Jones found a nice safe place to land his drive over second, but Beaumont bunted and forced him out at second. Gilman sacrificed for Beaumont, and Murray brought him home. Then Martin died at first. One run.

Ristine (who replaced LaMar), Midgley and Hammond got no bases.

Eighth Inning.

Jeffery put a safe fly between center and shortstop, Dowling drove for two bases, Enright bunted and while our Western contemporaries were throwing the ball around, Jeffery and Dowling scored. Mr. Stevenson, already distinguished, made a beautiful three base hit, scoring Enright. Jones failed to reach first, and so also did Beaumont and Gilman. Three runs.

Although Downing and Sharp made nice safe hits they did not become assets, because Messrs. Goodnow, Wilson and Tarelton failed to make first.

Ninth Inning.

Murray and Jeffery went out at first. Martin got as far as third. Allen made a drive to center field fence. Ristine flew out to the pitcher. Midgley got a pass but was doubled with Hammond.

SOCIETY AT THE GAME.

The M. C. B. and M. M. "400" were much in evdence. In fact the society editor of the sporting edition of the *Daily Railway Age Gazette* counted many more than four hundred of the elect as they journeyed to the base ball grounds.

Some rode in automobiles, some in carriages, and some in roller chairs along the Boardwalk, while most of them, with characteristic democratic simplicity, took advantage of the free rides on street cars that the committee had provided. None walked.

Handsome gowns, recent importations from Cleveland, Chicago, New York and Wichita, Kan., made more or less expressly for the occasion, were noticed in the boxes and in the automobiles behind third base.

Many faultlessly dressed gentlemen from the great railway and railway supply centers of the country were also noticed among the crowd. The ultra-fashionable tendency during the afternoon among the sterner sex seemed to be natty negligee outing suits of white flannel trousers, blue serge coats (on the automobile seats), straw hats, canes and shirt sleeves.

Among the automobile parties noticed by the society editor and his assistants were the following:

Mr. and Mrs. O. M. Edwards, Mr. and Mrs. J. J. Edwards, Mr. and Mrs. E. F. Chaffee.

Mr. and Mrs. A. E. Ostrander, Mr. and Mrs. C. J. Frost

Mr. and Mrs. C. W. Owston, Jr., Mr. L. A. Shepard, Mr. Charles Harris, Mr. McCabe.

Mr. and Mrs. W. A. Blanchard, Mr. and Mrs. A. S. Blanchard.

Mr. Frank R. Coates, Miss Tobin, Mr. and Mrs. James DeVoy, Mr. F. T. Reese.

Mr. L. J. Hibbard, Mr. E. R. Hibbard, Mr. and Mrs. McBain, Mr. and Mrs. Bloxan, Miss Bloxan.

Mr. and Mrs. E. H. Gold, Mr. and Mrs. Vilas, Mrs. Eacutt.

Mr. C. T. Schoen, Mr. H. Montgomery, Mr. B. P. Flory, Mr. Walter P. Hudson, Mr. C. E. Rood.

Mr. and Mrs. C. B. Young, Mr. and Mrs. Walter B. Leach, Mr. and Mrs. R. D. Smith.

NOTES OF THE GAME.

Ristine says it was because the buffing stresses were too high.

It wasn't a Western bunch that sang vociferously: "How glad I am!"

Jaybill Johnson—but why multiply words? He is an excellent chaperon.

The Eastern Club, despite its excellent team work, never had played together before.

The Score Girls' chorus, "How dry I am," was suggestive of the usual feminine fondness for "pop."

Dives throws the dust of its glittering wheels over the tattered garments of Lazarus."

Brazier accuses his newspaper friends of a breach of confidence in repeating his story of how he first learned to eat "pi" in a printing office, and therefore we are a little timorous about saying he was at the ball game.

When Billy Wilson, who sells staybolts out in the Western Wilds, soaked that liner to short in the last half of the third, a great shout arose from the grand stand. Alas, it was a "bolt" all right, but it didn't "stay" and William was out.

The crowd was perhaps the largest that ever attended a ball game played as one of the entertainment features of the mechanical conventions. It was quite a noisy crowd, too, until the Western team blew up. That reduced is loudness by about 50 per cent.

Montague should have ground his horn to give it a sharper tone and polished his sleigh bells to soften their notes, but probably he did not know where to get any grinding or polishing machinery.

"You're out" yelled the umpire, when Midgley's fine hit to right was caught, and just then a pretty girl dressed in blue, standing in a group of Eastern sympathizers down near the carriage entrance, began to dance a cake-walk. Her graceful dancing caused a round of applause among her friends. Wonder who she was.

EAST.

	Ab.	R.	H.	PO.	A.	E.	SH.
Gilman, C. F.,	5	0	1	1	0	0	1
Murray, 2 B.,	6	0	3	2	2	0	0
Oviatt, 1 B.,	2	1	2	5	0	0	0
Martin, 1 B.,	2	1	0	5	0	0	0
Jeffery, S. S. and P.,	5	1	1	1	3	0	1
Dowling, P. and S. S.,	4	4	1	2	1	0	0
Enright, C.,	5	3	2	6	0	0	0
Stevenson, L. F.,	5	2	3	0	0	0	0
Clancy, R. F.,	2	1	0	1	0	0	1
Jones, R. F.,	1	0	1	1	0	0	1
Beaumont, 3 B.,	4	2	1	3	1	0	1
Totals,	41	15	15	27	7	0	5

WEST.

	Ab.	R.	H.	PO.	A.	E.	SH.
Tarelton, P. and S. S.,	4	0	1	3	3	1	0
Allen, 3 B.,	3	0	1	2	1	1	1
LaMar, 2 B.,	2	0	0	0	1	1	0
Ristine, 2 B.,	2	0	0	1	2	0	0
Midgley, S. S. and P.,	3	0	0	1	7	2	0
Hammond, C.,	3	0	0	5	2	0	0
Goodnow, C. F. and R. F.,	3	0	0	1	1	2	0
Downing, 1 B., and C. F.,	3	0	1	4	1	2	0
Sharp, R. F.,	2	0	0	0	0	1	0
Forsyth, 1 B.,	1	0	1	9	0	0	0
Wilson, L. F.,	3	0	1	1	0	0	0
Totals,	29	0	5	27	18	10	1

The incubator man knew his business. He always, after the first few innings, had another goose egg ready to hang up.

Messrs. Thomas and Cory, who on the Pier and at the hotel are inseparable, even at the ball game were not divided.

Wildin does not smoke, but he has no objection to receiving a paper of matches when they are tendered to him in a proper manner.

Paul Armstrong had a ripping speech on his chest, until the game was about half over, but he was not allowed to get it off. After that he didn't want to.

A crowd of former rah, rah boys in the southern end of the grand stand invented a new yell about the middle of the game. It was: "East, east, east; beat 'em, beat 'em, east, east!"

The band was placed in the northern part of the grand stand, and played airs after each inning, which in future are apt to be more popular as reminiscences in the East than in the West.

John Whitridge occupied a seat in a gasolene wagon and hustled unrecognizingly ahead of his former fellow-laborers in the newspaper field. Thus, even now, "the Chariot of

The Atlantic City Weather Man evidenly is a fan. It was hot, but fine until the game ended. Clouds gathered, thickened and glowered, but the Weather Man restrained their fury until those who attended had time to get indoors. Then—wow, how it did rain!

No; those were not life preservers that were constantly being hung up on the green board at the far end of the field. That is, they were not so intended to be used, but they saved the lives of the Eastern nine, as there happened to be just one apiece in the supply handed out by the Westerners.

The Score Girls occupied a box immediately back of the home plate, where they indulged in cheers and ginger ale. When a foul hit the netting and the bottles leaning against it rattled to the floor, it sounded like Carrie Nation and her hatchet condemning dissipated habits.

There was some difference of opinion among the Score Girls as to the actual score. The one who took our fourth assistant sporting editor into her confidence said that she thought it was 26 to 19 because she saw 26 Eastern men fall down "just before they reached those pillows," and only 19 Western men did. But she wasn't sure, because the dirt didn't show so much on the grey uniform.

MR. HOOLEY ON THE BALL GAME.

"Ye shud have wint to th' ball game th' Saturdah afternoon," remarked Mr. Hooley to his friend Dennissey as they were taking a little something to counteract the effects of electricity and rheumatism in the atmosphere, and as a possible preventive against evil results from cyclonic disturbances. 'Twas a gr-reat game."

'I heard wan man fr'm Tchicago say 'twas th' only game he iver saw whin there was only wan side to play," remarked Mr. Dennissey.

"I dinnaw th' inthricate features av th' game as 'tis played in these days," replied Mr. Hooley, "but I niver wint to a game where th' aujyence av fans dishplayed a greater degray av enthoosiasm. 'Twas a fine day, 'nd th' ride to th' Inlet Par-rk was a jy 'nd a plisure, for by th' change fr'm th' whale chair to a bus, 'nd fr'm th' bus to th' strate cars, 'nd fr'm th' strate cars to yer fate again. I hadn't intinded to have wint to the game but that wan av me friends carled me by tiliphone 'nd towld me I wud miss th' game av me life iv I didn't go. I missed me way.

"I wint to wan game, 'twas twinty years ago th' summer that is, but 'twas a professional game. "Th' min that played th' day was ammychoors. Ye say, Dinnissey, whin a big boonch av relrod min 'nd shupply min have to spind a few days togither with nothing particular on th' mind av th' relrod min, th' shupply min thry to kape thim enthertained. They get up dances 'nd yooker parthies 'nd vodville shows f'r th' avinin' enthertainmint 'nd sacred concerts f'r Sundah whin they play wan piece that's not in rag time 'nd whin some wan has songs like th' Rosary or th' Hooley City that she wants to get off her mind, they lit her sing wanst. That's a sacred concert, Dinnissey. But on Saturdah, whin it's plisint, 'nd not too foggy or too hot like it gin'rally is at 'Tlantic City in th' gladsome summer time, they get up a ball game. Sometimes th' relrod min play against th' shupply min, 'nd thin th' way th' shupply min disicrate th' name av ball players wud make ye think they thought relrod min was lineal descindants av gr-reat Jove himsilf. But whin, as it was on Saturdah, they get up two teams, wan fr'm th' Wist 'nd wan fr'm th' Aste' ye'd expict thim to play ball, wudn't ye, Dinnissey?"

"Thrue f'r ye, Mr. Hooley. Th' Wist niver takes a back sate f'r anny wan, nor anny aggravation av min," replied Mr. Dennissey, with the customary patriotism and civic pride of an adopted Chicagoan. "Did th' Astern team fall down?"

"They did that," replied Mr. Hooley, "but 'twas arlways on th' bag 'nd while th' Tchicago man was pickin' up th' ball, or wondherin' whither th' man who threw it wanted it to go to sicond or first base. They was wan or two plays that I saw that made me think th' min hadn't spint arl their time on th' bleachers, but might have tossed a ball or sthruck at ut with a shtick wanst or twict before th' wint to th' field. Whin I tuk me place among th' rayporthers, th' Midgley lad, him as sills curthains, was a sittin on th' ball f'r fear 'twud get away fr'm him as it had a way av doin' fr'm th' other lads. And, Dinnissey, 'twas a good thing that th' Midgley lad is tall. He gave wan twist to his back 'nd lit his right arm shwing in th' direction av th' man at th' base. 'Twas a good throw, Dinnissey, 'nd I niver saw th' like in th' game I was tellin' ye av.

"There was wan other thing I saw a wistern man do. Th' lad that thravels f'r th' Union Draught Beer Company, 's I undhershtandt ut, was playin' shart shtop whin he wasn't pitchin'. Arl at wanst th' man wit' th' shtick found th' ball 'nd sint it in th' air out toward th' sails av th' schooners in th' Inlit. T'ree times he was playin' there th' ball came his way 'nd he got used to it. Whiniver a man hit th' ball th' lad ran out as far as he cud in th' time that he had, 'nd begorrah, ivery time, as I may say to his surprise, he 'nd th' ball wint in th' same d'rection. 'Twas fine wurrk, Dinnissey, but barrin' th' fine sittin' av Midgley 'twas arl th' game I saw th' Tchicago lads play.

"'Twas a great s'ciety evint, Dinnessey. Th' gasoline buggies was parked in wan side av th' field, 'nd th' rail birds occupied th' fince be th' cinter field, 'nd th' scaw gur-rls in wite had boxes in th' front av th' shtand 'nd some av th' min that had been at th' convintion f'r as much as three nights were ringin' bills 'nd tootin' harns 'nd thrying' to make spaches f'r their own enjymint. Th' scaw at th' close av th' game was 15 to 0, 'nd th' official publisher wud have given th' wistern team more goose eggs iv he had have had em. Th' wistern team laid goose eggs that fast that th' man who had to hang thim up had to take two at a time 'nd set wan up handy so that he cud reach it without delayin' th' game.

"But th' hittin', Dinnissey. If th' lad that th' wan in th' middle av th' peeled place on th' ground was thryin' to hit wit' th' ball 'd had a shtick like—will, like th' Absecon lighthouse 't ye cud see in th' distance, th' ball might have hit th' shtick wanst in awhile. But th' little shtick 'nd th' ball cudn't get togither. Wan av th' min whin he wint to th' battin' pla-ace, wud arlways t'row his bat on th' ground whin th' ball was startin' towards him. He cud hit a ball as big as th' eart' but nothin' smaller. I'm shpakin' av th' la-ads fr'm th' great city av Tchicago, Dinnissey, 'nd 'tis a great relafe to me to raymimber that I've bin at th' hotel long enough f'r th' city av me risidince to be forgotten be th' hotel people. Th' la-ads fr'm th' Aste played a good game f'r min that are onlyy ammychoors. Whin wan av th' wistern lads by chanst hit th' ball or whin I shud say th' ball hit th' shtick he was holdin', he'd look around to see which way th' ball wint 'nd arlways found that it had wint to th' first base about th' time he thought av gettin' ready to run somewhere in that gineral direction. It always got there first.

"But they was wan thing I saw whin I first wint to me sate," added Mr. Hooley, thoughtfully, "that made me think iv th' Tchicago lads did get th' game 'twud be a meeracul."

"What was that?" inquired Mr. Dinnissey, "nd why didn't ye have 'em know th' luck was against 'em?"

"'Twas their own fault. Th' only grane things was th' scaw board 'nd th' grass, 'nd ivery mother's son av th' wistern team wint into th' game wit' orange sthripes around his ar-rms 'nd th' dicorations av th' pinnants they were playin' f'r was yellow. Th' Tchicago la-ads was just a part av th' scenery," replied Mr. Hooley in a tone calculated to end the conversation.

COMPARATIVE REGISTRATION FIGURES.

A comparison of records of attendance for the three years up to and including last year has been made from the official data of the Railway Supply Manufacturers' Association. The figures are as follows:

	Free Badges	Badges Charged For		
	1907	1908	1909	Increase
Railway Men	736	637	668	31
Ladies	1494	870	901	31
Supply Men	1919	1176	1368	192
Guests	528	572	751	179
	4677	3255	3688	433

The apparent falling off of 1422 at the time of the introduction of the system of payment for badges is partially offset by the duplication of names of railway men; while the actual increase for the second year of the working of the pay system is 433, as shown. It should be noted that in no year was any charge made for the badges for railway men.

Conventionalities.

Whipple is around introducing a new recruit in the form of H. F. Stevenson, who has just been elected secretary of the Whipple Supply Company.

Welling G. Sickel, who was formerly with the United & Globe Rubber Company, is attending the convention in the interest of the Hewitt Rubber Company.

The only man seen or heard knocking during the convention thus far is R. F. Hayes. He had a hatchet and some tacks and a poster announcing the vaudeville performance.

The military features of the euchre party on Friday evening were not extended to the alignment of the tables. Some ranks looked like the butt end of a St. Patrick's Day parade at 4 o'clock in the afternoon.

Everybody is glad that at last we have some weather that makes it appropriate to wear a light suit—everybody, that is, but the man who has got to buy a straw hat before he can put on his.

F. O. Fettinzer, of the Safety Car Heating & Lighting Company, kept our official score card at the game Saturday afternoon. It wasn't the easiest job in the world to keep it straight, but he is some score keeper.

Major Azel Ames, representing the Kerite Insulated Wire & Cable Company, and a member of the Board of Signal and Train Control of the Interstate Commerce Commission, is in attendance at the convention.

J. S. Seabury, who will be remembered as having attended the convention for several years in the interest of Massachusetts Mohair Plush Company, has been unavoidably detained, and will not be able to reach Atlantic City this year.

It is to be regretted that the title of H. H. Vaughan, assistant to the vice-president of the Canadian Pacific, appeared in our registration list on Saturday morning as "S. M. P." Undoubtedly, we notice it much more than Mr. Vaughan does; but, anyway, we fancy the error is one on Joe.

The gentlemen in khaki, who served at the Military Euchre on Friday evening, made a very presentable appearance and it was only in their consciousness of being in uniform and the occasional tripping over a sword that they betrayed any of the characteristics of Coxey's famous army.

J. D. McIlwain and C. S. Rea played as partners in the euchre game and won eight flags. It is understood that they were ruled out of the possession of the first choice of prizes owing to the difficulty of determining which had the more ladylike appearance.

Mayor Stoy, of Atlantic City, spent Saturday morning on the Million Dollar Steel Pier. He was introduced to the officers of the Railway and Railway Supply Associations whom he had not previously met, and later in the morning passed an hour among the exhibits.

It was not exactly a "crochet" effect that our imported base ball editor meant when he was describing the result of the use of a proper equipment of double body bolsters and double-coil nest springs in sliding bases. Knit. He wrote "ricochet." But this was in the Sunday supplement.

The headings to the several articles about the exhibit of the Sprague Electric Company puts one in mind of a haberdashery—or a scene on the boardwalk on a windy day. The only thing missing from the matter printed under the respective heads is some reference to a six months' guarantee against holes.

Louis Turivas is here in the interest of the Great Western Smelting & Refining Company. It is needless to say much about Louis, for every one knows him for his good fellowship. He has not attended these conventions lately, but a few years ago, especially at Saratoga, he was always in evidence.

The first number on the program of the "Song and Story Recital" to be given by Willa Holt Wakefield on Monday afternoon, is "The Girl With the Clockings." As B. L. T., the "Line-o-type Or Two" man of the *Chicago Tribune* says: "You can almost make a poem out of that."

Mr. and Mrs. William Marshall, who hold a long, unbroken record for attendance at these conventions, came pretty near to breaking the continuity. They had engaged steamer passage to the other side, but changed their minds just before sailing.

George A. Post arrived Thursday evening, and has since been dividing his discourses about equally between the devices sold by the Standard Coupler Company and the excellent work that the Railway Business Association has been doing in the way of educating public sentiment on railway affairs.

Leonard J. Hibbard, chairman of the base ball committee, devoted a great deal of time and labor to the arrangements for the base ball game on Saturday, and he deserves great credit for its success. He was ably assisted by the other members of the committee, J. L. Connors, Phillip J. Mitchell, Frank Martin, Fritz B. Ernst, W. J. Walsh and E. P. Smith.

Miss Jessie C. Lungren won a beautiful cut glass vase in the euchre contest and naturally feels disturbed that the nearest approach to a record of her triumph in the *Daily* of Saturday morning was the name "Miss Munger." Our apology is simply to refer to the fact that it was necessary to telephone all the names of winners of prizes to a Philadelphia print-shop at 2 A. M.

When the storm broke on Saturday afternoon it found the big windows forming the front of the *Daily* office wide open and, as usual in such cases, they stuck and wouldn't close. With the assistance of the canvas curtain serving as a sail, the wind lifted a desk off its base and would have overturned it had not a heavy weight member of the staff placed himself in the position of a brace. Later, when the heavens opened and the floods came, all desks had to be hauled to the rear of the space, telephone communication was cut off, the lights went out or wouldn't go on, the floor, and, incidentally, several pairs of trousers and shoes, were flooded and the editors engaged upon the "Base Ball Extra" gratefully accepted the hospitality of a kind neighbor, and did much of their work in his quarters. We were nearly shipwrecked, but succeeded in saving all lives, dope and other property.

CONSOLIDATION BY TRIAL MARRIAGE.

(Respectfully Dedicated to W. A. Nettleton.)

"Where are you going, Miss M. C. B.?"
"About my business, as you see."
"May I go with you where you go?
"You're kindly welcome, as you know."
"Will you help me manage my affairs?"
"I've my own work and many cares."
"I've money given in trust to me."
"I represent my family."
"Will you change your name—take mine instead,"
"My name is my fortune, sir," she said.
"But we can't unite on terms like that!"
"Nobody asked you to. That's flat."

THE ENGINEMAN'S LAMENT.

When the rails is wet and greasy and the sander's full of muck,
And ye hear the "whoosh!-whoosh!-whir-r-r-r" as the engine starts to 'buck,
And the clankin' of the couplers and the rattlin' of the brakes,
When your ten-wheel's got a load big as what a Mallet takes—
O, that's the time a feller is a-feelin' at his wust,
And he hopes the blamed old biler'll take another fit and bust;
Then he damns the roundhouse foreman up the scale and down, for luck—
When the rails is wet and greasy and the sander's full of muck.

They's something kinder sulphur-like about the atmusfere,
When ye've got to make the sidin' and the number two's most here;
Of course ye nurse the throttle and ye catch her best ye know,
And the fireman's helpin' all he kin to get her on the go;
But when sev'ral tubes are leakin' and the coal's about half slate,
And the stack's a-pullin' holes so 't ye see more'n half the grate,
Ev'ry time the wheels fly 'round, ye swear and cuss ye'er luck—
When the rails is wet and greasy and the sander's full of muck.

Poet Riley hears the raspin' of the tangled leaves of corn,
And the husky, rusty russel of the tossels, gold as morn,
And his heart is set a-clickin' like the tickin' of a clock
'Cause the frost is on the punkin and the fodder's in the shock.
You can see the yellow punkins, but they only make you think
Of that punkin-headed 'ostler who'd had another drink;
And ye'er golden corn-cob pipe's all right, but ye've got no time to suck—
When the rails is wet and greasy and the sander's full of muck.

Ef I wuz bossin' on the job, I don't know, but seems to me,
I'd have a roundhouse foreman who was bright enough to see
That an engine leaves the house all right, and fixed up for a trip,
And so't with decent handlin', there needn't be a slip;
And I'd fix the load accordin' to the tonnage she could haul,
And, just because they's lots of cars, not try to take 'em all;
Because, about five times in ten, it's just an engine's luck
That the rails is wet and greasy and the sander's full of muck.

GRAND OPERA.

At the reception this evening to President Wildin and his fellow officers the Cadets de Gascon will sing in grand opera at 8.30.

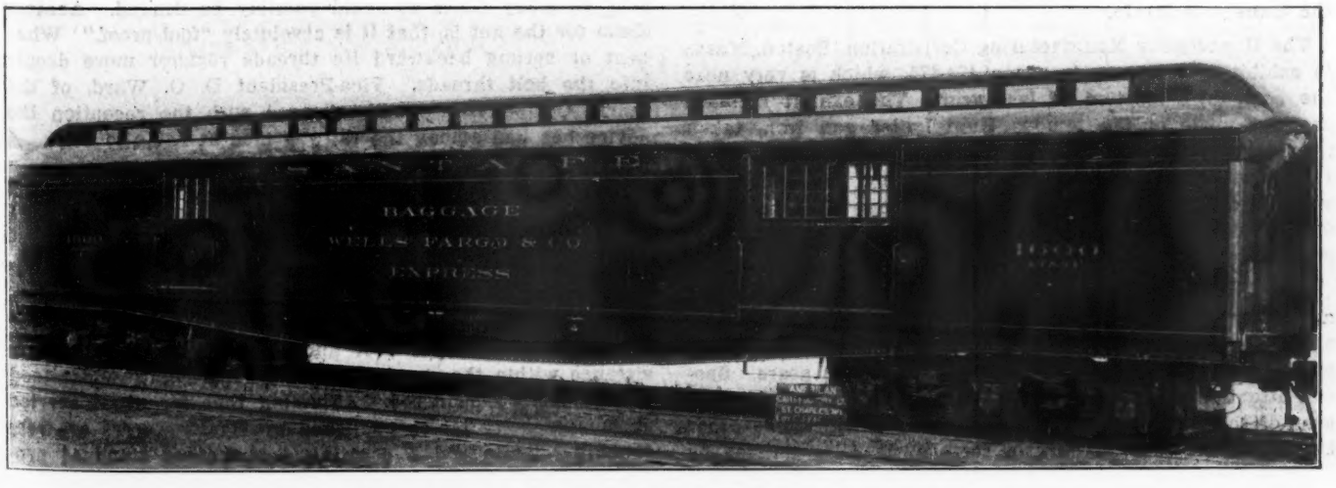
SONG AND STORY RECITAL.

Those who fail to hear Willa Holt Wakefield in her song and story recital, of which the program is given elsewhere, are assured in advance by the entertainment committee that they will miss an opportunity to hear an entertainer who commands a higher recompense for her work than any other entertainer in the country in a similar line.

SANTA FE 70 FT. BAGGAGE CAR.

The large baggage cars recently built for the Santa Fe by the American Car & Foundry Company, New York, are notable for the very stiff and strong construction used in the steel underframe. The superstructure is wood and follows well established practice, excepting that the ends are completely sheathed with ⅛ in. steel plates.

The cars have six wheel trucks with cast steel frames, 5 x 9 in. journals, 37¼ in. wheels. The weight of the two trucks is 42,500 lbs. and the car body 63,500 lbs.; total, 106,000 lbs. The center sills and side sills are fish belly girders with webb plates 5-16 in. thick. These are reinforced by angles at the top and bottom, and there is a ¼-in. cover plate on the top of the center sill. These latter sills are 30½ in. deep at the center and 13 in. deep at bolster and end sills. They have two angles 3 x 3 x ⅜ in. riveted to the bottom and one of the same size riveted to the top of the webb. The whole underframe is braced horizontally by 8 x ¼ in. plate diagonals and in the end panels by wide ¼ in. plate gussets. There is a 5 in. steel channel on each side for the intermediate sill. The double body bolster is made of open hearth steel plates, with pressed steel diaphragms and covers ¼ in. thick, reinforced on the bottom by ½ x ⅛ in. plates. Diaphragms ¼ in. thick and the full depth of the sills for crossbearers are located as shown on drawing. The construction and dimensions of the wood superstructure are shown in the detailed drawings. The roof covering is No. 6 duck, and the usual wood flooring 1¾ in. thick is used in connection with mineral wool deafening. The vapor system of steam heat, supplied by the Chicago Car Heating Company, Chicago, is used, and the lighting is by the Pintsch gas system. The brakes are Westinghouse schedule "L N," with American slack adjusters. The leverages are arranged to produce a braking power of 90 per cent of the light weight of the car.



Santa Fe 70-Ft. Baggage Car.

The Exhibit.

One of the new brake beams shown by the Buffalo Brake Beam Company that is attracting much attention, is a high speed, double truss, passenger beam with adjustable head.

The Independent Pneumatic Tool Company, Chicago, has sold to D. B. Edwards, of Atlantic City, the Thor motorcycle that has formed a part of the company's exhibit in booth 486-488.

John Havron, formerly president of the Rogers Locomotive Works, has been made president of the Walker & Bennett Manufacturing Company, with offices at 519 West Twenty-ninth street, New York. This company is placing on the market a new design of car seat.

The General Electric booth holds many machine tools which have been used in the shop. These were originally belt driven, but have been changed to motor drive. They are shown to prove the ease of changing the method.

engineers' brake valves and taper reamers. These parts were ground on machines similar to those shown in the exhibit, and the demonstrator in charge can give the actual grinding time required for each part.

The United States Express Company was unable to get space among the exhibits on the pier, so it has opened an office directly opposite the main entrance where special attention is given to both incoming and outgoing express matter for all points.

A very complete line of ground locomotive parts is being exhibited at the booth of the Landis Tool Company, Waynesboro, Pa. These include pistons, valve yokes, knuckle pins, crosshead pins, link blocks with plates, air pump pistons with rods, valve rod bolts, link bolts, triple valves, rotary

The Garlock air pump packing is put up in sets to exactly fit the stuffing box. It has had the most exacting service extending over several years in connection with different makes of air brakes. It is lubricated perfectly, prevents groaning of the air pumps, and does not cut or wear the piston rods.

The Long Island Railroad has been buying considerable quantities of car Karbolith from the American Mason Safety Tread Company, Boston, Mass. The New York & Queens County Railway is another recent user of car Karbolith. The new cars for the Harriman Lines, being built by the American Car & Foundry Company at St. Charles, Mo., will require over 10,000 sq. ft. of Mason safety tread.

The Buffalo Brake Beam Company, New York, is showing its new forms of trussed beams. The new section, consisting of a special form of channel for the compression member, is a radical departure in this line. The new beam has stood some severe tests and is strongly recommended for high speed service. This beam also shows a very high resistance on the transverse strain.

The Hunt-Spiller Manufacturing Corporation, Boston, Mass., is exhibiting this year in space 474-475, which is very near the company's location of last year. The exhibit includes castings made of the famous Hunt-Spiller gun iron, taken from service for exhibition purposes. There are also eccentrics and straps, crosshead shoes, driving box shoes and wedges, cylinder packing rings and piston valve bushings. The evidence of service rendered by these products is conclusive.

The T. H. Symington Company, Baltimore, Md., is showing a number of very interesting exhibits of Farlow draft gear applied to different designs of underframing, including Farlow attachments in combination with several friction gears. Special attention is called to the elimination in the Farlow draft gear of the yoke and yoke rivets necessary with some other types of draft gear; failure of these parts, it is claimed by The T. H. Symington Company, being a source of trouble and a heavy maintenance charge.

The Independent Pneumatic Tool Company, Chicago, is attracting an unusually large crowd with its display of air drills, hammers, and staybolt drivers. A complete line of these tools is included in this exhibit, and each class offers some new improvement in construction. The Corliss valve motion in the drills, duplex valves in chipping, chalking and beading hammers and one-piece riveting hammers are a few of the desirable features found in these machines.

A special spring plug cock, designed to overcome the disadvantage of the ordinary cock, is now manufactured by the National Tube Company, Pittsburgh, Pa. Considerable trouble and annoyance may be caused by a defective cock. The special spring plug cock made by the National Tube Company, Pittsburgh, Pa., is proof against much of the injury to which common cocks are subjected. The advantages should be readily recognized; and this new type of cock should not be overlooked by the mechanical man interested in improving his equipment.

The Garlock locomotive throttle packing has been adopted as standard by many railways. A blow-out with this packing is next to impossible. A semi-metallic bottom ring guards the fibrous rings from water where the throttle stem enters the boiler head. It is said to last longer and give better service than any other material that has been used for this service. Known as style 3200, it is put up in sets to fit exactly the stuffing box.

Style 3222 differs from 3200 in that it is a special throttle packing and made to meet particular and exacting conditions, like stuffing on the steam dome, etc.

When a prominent superintendent of motive power was asked for information as to the saving accomplished by the use of mica headlight chimneys, he remarked to Mr. Storrs, of the Storrs Mica Company, Owego, N. Y., while waiting for the figures from his clerical force, that regardless of the comparison in cost of chimneys he would continue to use the mica chimney in all his headlights because of the marked decrease in the number of headlight failures which was clearly effected by the use of the mica chimney. He considered the benefits from their use more than offset the increase in cost. The figures, however, are said to have shown a saving in favor of the mica of over 30 per cent, and other roads have shown even a larger saving.

The claims of merit possessed by the "Boss" nut, manufactured by the B. M. Osbun Company, Chicago, are based upon its biting edges operating in combination with a common nut and bolt; also its yielding character in springing backward, when forced by a wrench, until its threads sink firmly into the valley of the bolt thread. The "Boss" nut can be taken off, but only by the use of a wrench; and it can be put on again, same side as used before or the reverse side, as many times as could possibly be desired. Another claim for the nut is, that it is absolutely "fool-proof." When bent or sprung backward its threads register more deeply into the bolt threads. Vice-President D. O. Ward, of the Osbun Company, is greatly pleased with the reception the device has had among the railway men at Atlantic City.

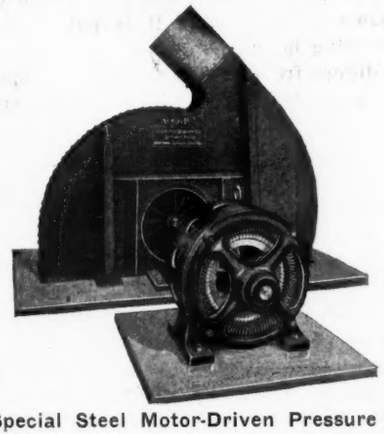
BLOWING EQUIPMENT FOR FORGES, FURNACES AND CUPOLAS.

The proper air supply to the cupola is the chief consideration leading to economical, rapid and continuous melting, also to the fine quality of iron obtained. Both volume for perfect combustion of fuel and pressure to overcome resistance within the cupola have to be thoroughly understood and carefully considered. Assuming that for usual service various capacity tables published by manufacturers are reasonably reliable and a centrifugal blower of standard pro-

portions is selected for the work, the user is hen confronted with the problem of how to drive the blower most economically. The speeds are usually excessive for motor drive, and where alternating current only is available and certain fixed motor speeds have to be considered, direct connection to standard centrifugal blowers is impossible. The same problem must be solved in large railway shops where air at high pressure is required for supplying blast to oil burning furnaces, etc. The desirability of doing away entirely with countershafts and belts is apparent. Gearing is not satisfactory, and is uneconomical.

Appreciating the need of a centrifugal blower to which could be direct connected an electric motor wound for standard speeds, the American Blower Company, Detroit, Mich., designed and put on the market the "ABC" special centrifugal blower. Blowers of this type are being used at the various plants of the American Car & Foundry Company, by the Grand Trunk, at Battle Creek, Mich., and the Central of Georgia for forcing forge fires and oil burning furnaces. By increasing the diameter of the impeller and altering the proportions of the other parts, the speed can be made to conform with that of any motor, and, at the same time, the blower will produce any pressure and deliver any volume of air within the possibilities of accomplishment with centrifugal pressure blowers.

These blowers are built entirely of steel, and are amply strong for the severest conditions. The motor is attached by



ABC Special Steel Motor-Driven Pressure Blower.

a flexible coupling, which avoids any trouble from imperfect alinement through the use of four bearings in a row, two of which are on the motor and two on the blower. These blowers will produce pressures up to 20 ounces per square inch, at moderate speeds, and run coolly and quietly. They are far more efficient than smaller blowers, require much less space than belt-driven outfits and are no more troublesome than the motor. The strain on the bearings, due to the belt pull, is entirely eliminated, and, owing to the slower speed, the tendency to heating of the bearings is materially reduced.

APPRENTICE INSTRUCTION.

There are two methods of apprentice instruction now in operation on railways in this country; one in which the instruction is made a part of the work of the railway staff organization; the other is the method pursued by the International Correspondence Schools, of Scranton, Pa. This school has its system in operation on several roads with considerable success. It is educating a number of apprentice students by bringing them to these conventions. There is a group of more than a dozen young men who, by their proficiency in their studies, have won this privilege and are enjoying it to its full extent. They are spending their time in observing and studying the exhibits. The Railway Department of the International Correspondence Schools, Scranton Pa., has the results of the work of those energetic young men on exhibit in Space 26.

McCONWAY & TORLEY COMPANY'S NEW TRUCK DESIGNS.

In the exhibit of the McConway & Torley Company, Pittsburgh, Pa., will be found the various forms of M. C. B. couplers which have become so well introduced on many of the large railway systems. These include the original Janney passenger coupler, the Pitt freight coupler, the Buhoup 3-stem passenger coupler, the Pitt tender coupler and the Pitt pilot coupler. The company also exhibits a platform showing the Pitt coupler adapted to passenger service and specially designed for the new steel passenger equipment of the Pennsylvania Railroad. In this coupler the head is hinged on the shank by a large pin. It is also porvided with the McConway centering device. The uncoupling rigging is arranged with a side handle so as to uncouple from the ground, and also with a handle on the platform for uncoupling in the usual manner.

This company displays this year some interesting developments and improvements in cast steel truck side frames. One of these is shown in full size casting. The Buhoup cast steel side frame, in addition to the ordinary requirements of the Diamond truck, has distinctive features peculiarly its own. The prominent feature is the adjustable bolster columns, which permit of the insertion of the bolster after the balance of the truck has been assembled; and also of the removal and replacing of bolsters without disturbing any other part of the truck. These bolster columns are hinged on trunnions at the bottom and held in place by a large pin near the top. When it is desired to remove the bolster these pins are pulled out, the columns are thrown back, rotating on the trunnion, and the space is thus widened so as to permit of the easy removal of the bolster. The lower portion of the frame is extended out under the journal box and cast integral with the main frame, thus dispensing with the use of tie bars and all nuts on the journal box bolts, a split key in each bolt being sufficient to secure the box. This avoids the trouble due to the removal of rusty nuts from the journal box bolts and makes it quite easy to renew boxes in repairs.

Another advantage of the hinged bolster columns is the fact that when they are worn they can be easily replaced with new ones, and the main truck side thus becomes a good as new. The brake shoe hanger supports are also cast integral with the bolster columns, so that the brake shoes are maintained at a constant distance from the rail.

This company also exhibits a model of the new Buhoup flexible truck. In this design the bolster has projections on each side which extend through the truck side, with braces on the outside of the truck frame. These projections have widespread spring bearings, so that the tilting action of the truck on rough track is taken up by the springs and not transmitted rigidly to the bolster. The arrangement in effect makes use of the truck frame as an equalizer, and there is thus obtained the benefits of flexibility corresponding to the equalized truck by the use of a much less expensive design. The model has the rails equivalent to a vertical offset of 1½ in. in full size track, and when the model truck is run over this, making a considerable angularity in the truck side, the bolster remains horizontal; and the motion due to such irregularities in the track is not transmitted rigidly to the bolster, as it is in the ordinary rigid truck frame. The central portion of the bolster end is supported on springs in the lower pocket in the usual manner. There are thus four helical springs under the end of the bolster and one under each end of the transmission bar, making six springs in each truck side. By this method more spring motion can be obtained than is possible in the space ordinarily provided for bolster springs. The truck side also has cast projections which carry a bracket for the

brake shoe hangers so that the brakes are hung to the truck side and not to the bolster; and they do not move up and down with the motion of the bolster, but are maintained at a constant distance from the rail.

BRILL IMPROVED BRAKE HANGER.

An important feature of the heavy electric truck at booth 403, that of the J. G. Brill Company, Philadelphia, is an improved type of noiseless brake hanger. This device is new to most of the steam railway master mechanics, for heretofore it has been used only on electric trucks. Since its adoption for all Brill trucks, two years ago, the "half ball brake hanger," as it is called, has proven to be the most advanced type of noiseless and self-adjusting brake hanger ever put on the market. Master mechanics and all interested in truck matters who have not examined this hanger should make a special point of doing so.

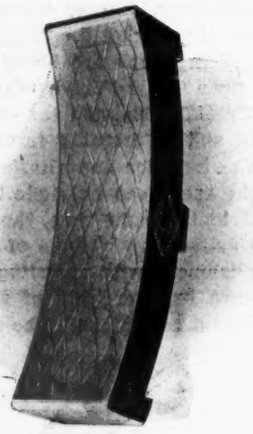
A full sized model, with M. C. B. brake shoe and holder, is at hand to help to explain clearly the mechanical features. The adjusting nuts which have defeated the purpose of most noiseless brake hangers are omitted, and it is not only self-adjusting for wear of the hanger parts, but also for changes in the relative position of brake shoe and wheel. The device consists of a pair of hanger forgings with half-ball ends. The ends are held firmly in hemispherical sockets; a spiral spring on a bolt, which is in tension against the spring, being utilized for each pair of hanger ends. The half-ball ends of the hanger forging are milled and the hemispherical sockets of the malleable castings into which they fit are reamed, providing an absolute fit. The load and all movement, and consequently all wear, are brought upon the two finished surfaces, for the bolt which passes through the malleable socket casting and the hanger ends, and on which the compression spring is placed, serves entirely as a compression member for the spring and carries no other load, and is never in shear. In fact, the hole in the socket casting through which the bolt passes is one-eighth inch larger than the diameter of the bolt. This allows a slight torsional movement and makes the hanger self-adjusting for lateral motion of the wheels.

EXHIBIT OF AMERICAN BRAKE SHOE & FOUNDRY COMPANY.

The American Brake Shoe & Foundry Company, Mahwah, N. J., has its usual attractive booth and complete exhibit of brake shoes in space 411. A complete assortment of improved brake shoes is exhibited, some of which are the regular standards in general use, while others show improvements in construction which are well worth the careful attention of all interested in brake shoes for locomotive, coach and car service. The improvement in locomotive brake shoes consists in reinforcement of the cast iron body from face to back, locking the inserts which give durability, friction and tire dressing benefits to the body metal, and preventing the falling out of inserts or the falling away of portions of the body metal during the life of the shoe. The same principle is applied to shoes for heavy passenger service, the amount and character of the inserts being varied to meet the conditions to be met.

The report of the M. C. B. brake shoe committee on tests of brake shoes, both on the Purdue and American Brake Shoe & Foundry Company machines, indicates the superiority of the Diamond "S" brake shoe, both in friction and durability, over all other shoes in test, excepting shoes which are very injurious to the wheels. In the consideration of brake shoes it is well to bear in mind certain *facts*, as follows:—(1) Some shoes hold well and wear fast; (2) some shoes hold less and wear longer; and (3) some shoes hold well, wear long and cut wheels. But the Diamond "S" shoes hold well, wear long and do not cut wheels.

The Diamond "S" construction is shown in the illustration. It is not new, as this type of shoe has been largely used for many years; but the Diamond "S" shoe of to-day has been specially developed with reference to the heaviest and hardest service incident to the improvements in brake mechanism for the high speed trains of modern railway service. It is a reinforced shoe from face to back, with the highest friction and longest life without any bad effect on steel tired or rolled steel wheels. The Diamond "S" shoe will stand up



The Diamond "S" Brake Shoe.

when the plain cast iron shoe melts or falls to pieces, and the chilled shoes disintegrate. These things were proved in the exhaustive tests made on the Lake Shore road last year.

For freight service the Diamond "S" shoe is the most suitable. Its high friction, long life, and harmless action on the wheel tread will increase the efficiency of the brakes, while reducing the cost of maintenance.

The representatives of the American Brake Shoe & Foundry Company are waiting to explain, with sample illustrations, all the improvements and good points of the concern's products. Drop in at booth 411.

THE BOWSER AUTOMATIC MEASURING PUMP AND METER.

The Bowser system of oil storage, transmission and measurement has been so extensively introduced that its features and advantages are now well understood. The fixtures required for railway oil houses are illustrated by a variety of samples in the exhibit of S. F. Bowser & Company, Fort Wayne, Ind.

Attention is now called to two important additions to the company's line of pumps and measures. To meet the demand for a more rapid method of filling barrels, mixing vats and supply cars, it now furnishes an automatic self-measuring power pump. This pump can be belted or directly connected to any source of power, such as electric motor or line shaft, and wherever located will pump oil any distance from the storage tank and accurately measure any desired quantity, from one to 1,100 gals. When the indicated amount is drawn, the pump stops automatically. If it is desired to fill barrels with 50 gals. of oil, the pump is set at this figure, and it will only cease pumping when the 50 gals. are drawn, unless purposely shut off. Barrels are thus filled one after another as fast as they can be handled. The oil is pumped in this way at the rate of 15 to 20 gals. a minute. In a paint shop this new pump will accurately deliver any required oil or other liquid directly into the mixing vat. It can be set for several

hundred gallons of benzine or for 100 gals. of varnish, and no other attention is required. The exact quantity of liquid is delivered in one-tenth of the time otherwise required.

The Bowser automatic registering measure is another new improvement made by this company, and it is designed to record and control the flow of oil through a pipe of any diameter where the force is supplied by gravity or pressure. It not only acts as a meter registering up to 100,000 gals., but it can be set for any amount from one gallon to 1,100,

Bowser Automatic Registering Measure.

and when the desired quantity has passed through the meter will shut off instantly. This meter is especially useful for filling tenders of oil-burning locomotives, and by its use the consumption of oil by locomotives can be accurately measured and recorded. It is also useful for filling storage tanks directly from tank cars.

In addition to the large business with railway oil houses, S. F. Bowser & Company have developed a large trade in connection with the supply of gasolene for automobiles, and the various features which have been found so convenient and useful in the locomotive oil houses are here employed.

SCIENTIFIC FACTS ABOUT RIVETS.

The Champion Rivet Company, of Cleveland, Ohio, the first rivet maker in the United States to inaugurate a series of standard dimensions for rivetheads and formulæ for finding dimensions, has compiled a very valuable and useful book of information embodying the most important specifications adopted by the United States government and various bureaus of inspection and test in this and foreign countries. Included also are a number of original articles, written especially for this work, on "How to Heat and Drive Good Steel Rivets." Copies of this book may be had on application to W. H. S. Bateman, general eastern and southern sales agent, whose headquarters is at the Parkesburg Iron Company's booth, 388.

THE BETTENDORF PLANT.

A few miles from Davenport, Iowa, and running from the Mississippi River back up to the high ridge of land that parallels the river, is located the town of Bettendorf. A few years ago the farms stretched unbroken where now the plant of the Bettendorf Company covers acres of ground.

The great Bettendorf plant, as shown in the accompanying illustration, stretches along the river, and not far from it, for nearly a mile. At the left of the illustration is shown the new steel foundry which has been built during the last year. This building is 400 ft. x 800 feet. The building immediately in the foreground and in front of the foundry is the office building. The main office building will be seen in the center of the picture in front of the main erecting shop, which extends in its entire length for about half a mile. The machine shop, power house and other buildings are located between the main erecting shop and the river.

Twenty-four hours in the day, train load after train load of the raw material is taken into the plant, and as many more trains taken away of the finished product.

Not only because of the originality of design, but also because of the economical manner of construction, the Bettendorf plant is easily one of the most interesting among the many plants of the various railway supply companies of this country.

Plant of the Bettendorf Axle Company.

HOBART-ALLFREE VALVE GEAR.

The new radial valve gear designed by the Hobart-Allfree Company, Chicago, is shown in booth 436 by a model of a complete locomotive. The new valve gear is an outside gear of the radial type and is said to possess all the advantages of other gears without some of their objections. There are no sliding joints, no links or link blocks, and the joints have bushings. This gear was described with illustrations in the large and easily lubricated pins with removable bronze *Railway Age Gazette*, June 17, page 1574. An inspection of the model will show its extreme simplicity. It is easily accessible from all points and the maintenance cost should be quite low. A handsome catalogue, which fully describes and illustrates this gear, can be obtained at the company's booth, or by mail on application. In addition to the illustrations, the catalogue contains a table of valve events taken from a Kansas City Southern engine. These show the actual performance of the gear on a locomotive in regular operation.

NATIONAL SASH BALANCE.

The National sash balance, made by the National Lock Washer Company, Newark, N. J., is a specially constructed spring roller, located in the heading above the sash, and connected with the sash by belts, having brass straps at either end, making a soft, noiseless fixture. The webbing is chemically treated so as to make it water and fire-proof. The company is also furnishing chain connections with this balance, when desired, and has a newly-patented attaching device for fastening the chains to the roller. These chains can be adjusted to any position along the roller, which does away with soldering chains to roller.

FORSYTH HIGH CAPACITY RADIAL DRAFT GEAR AND YOKE.

The high capacity radial draft gear, made by Forsyth Brothers Company, Chicago, is illustrated in Fig. 1. It depends for its cushion upon spring friction plates. These latter are deflected between followers having oppositely curved surfaces between which the plates lie. The curvature of the contacting faces of the followers are within the elastic limits of the plates, and no matter how many plates are used or how severe the buffing shocks, the plates can never become set or injured. The friction developed between these plates is very great; and operates to dampen the recoil to a wonderful degree. This gear in spite of its high capacity (300,000 lbs., or as much more as plates are added) is unusually short, the standard distance between the draft lugs being only 19 in. Also its high capacity can be obtained with a 6½-in. butt of drawbar. The shorter yoke and smaller pocket required, therefore, with this gear, makes the cost of application remarkably low.

The main thing about a draft gear, is not whether it affords a high capacity cushion under gradual strains; but whether it does this under sudden shocks particularly under buff. The Forsyth gear is unique, in that it affords even higher shock absorbing capacities under abrupt than gradual shocks.

The price of the gear is also especially low, from the fact that all the followers are furnished complete. And with most standard gears the carbuilder or road are required to furnish the end followers. In using the Forsyth gear, therefore, there would be a saving owing to this of several dollars per car.

The Forsyth gear can be used with the ordinary wrought iron yoke and with the end followers having the customary flat outer faces. The end followers are here provided with concave formations, and bearing against the latter are convex blocks. Where a wrought iron yoke is used, these convex blocks are riveted at its inner end (taking the place of the filler casting at this point recommended by the M. C. B. Association) and to the top and bottom walls of the yoke immediately back of the drawbar butt. Where the Forsyth cast steel yoke is used, on the other hand, these bearings are cast integral therewith, no riveting of same is required.

One of the greatest problems that the road has had to contend with has been the shearing of yoke rivets and this has been found to be due not so much to draft as to side strains. Heretofore, to maintain a yoke on substantially the center line of the draft rigging, it has been customary to have the follower stops, or draft castings, extend to within a short distance of each side of the yoke, with the result that after the coupler has been moved over a slight distane to one side, as on a curve, the drawbar has been turned into a crowbar. The follower stops, or draft castings, have first become fulcrum points and then the yoke has become actually bound or wedged in between the same. Further, side travel of the drawbar has naturally resulted in a deliberate shear being transmitted to the yoke rivets. In other words, the drawbar and the yoke have been to each other as shear-blades, and it is a small wonder that under these conditions the rivets have been sheared. An examination of freight cars that have been in service for any reasonable time will show a very large percentage of the yoke rivets loose and this has been primarily due to the side-shearing strains. In other words, the yoke should be allowed perfect freedom of lateral strains, along with the drawbar rigidly riveted thereto; and to make this possible, sufficient clearance must be allowed between the follower stops, or draft castings, and the yoke; and especially between the inner end of the yoke and the rear follower stops during buffing on curves. The latter is true, because under buff on curves the pivotal point is between the end of the drawbar butt and the front follower, and this point is further away from the inner end of the yoke than the carry iron. Consequently, clearance at the latter point has to be greatly increased as between the inner end of the yoke and the rear follower stops. This latter can only be obtained by tapering the yoke, according to the Forsyth design, toward its inner end; and in order to do this and at the same time maintain the uniform strength of yoke, the latter has to be vertically tapered in the opposite direction.

The Forsyth yoke further does away with the shearing of the yoke rivets, because it engages the drawbar butt between two sets of shoulders, namely, the forward inwardly turned ends and the bearing blocks cast in one piece with the yoke immediately back of the drawbar butt. If desired, although not necessary, there can be used with the Forsyth yoke the third rivet in advance of the drawbar butt.

Aside from its extraordinary strength and doing away with all shearing of the yoke rivets, the Forsyth yoke possesses the essential qualification that it does not require a special drawbar, which in freight equipment is impracticable. Furthermore, it will be remembered that in the ordinary wrought iron yoke something like 33⅓ per cent of the metal lying back of the drawbar butt is waste: for the reason that the yoke is no stronger than the metal left on each side of the rivet holes. In the Forsyth cast steel yoke, however, enough metal is added on each side of the rivet holes to offset the weakening effect of the holes and to maintain a uniform and higher cross-sectional area and strength of the yoke than the ordinary wrought iron one. The Forsyth yoke also provides what has been long sought, namely, rounded bearings between the followers and the yoke so that under draft and buff on curves the ordinary canting and edgewise cramping of the followers and gear is done away with. In other words, under buffing and draft on curves as well as straight track, the strains are applied on the center of the gear.

The Forsyth yoke, therefore, in a word, not only affords the simplest and strongest connection between the drawbar

and draft gear without any departure from present standards, but it also does away with the shearing of yoke rivets by allowing perfect freedom of side swing of the yoke along with the drawbar. Under the outward thrust of the spring plates (and without the use of any additional centering device) the "radial" feature (including the concave and convex

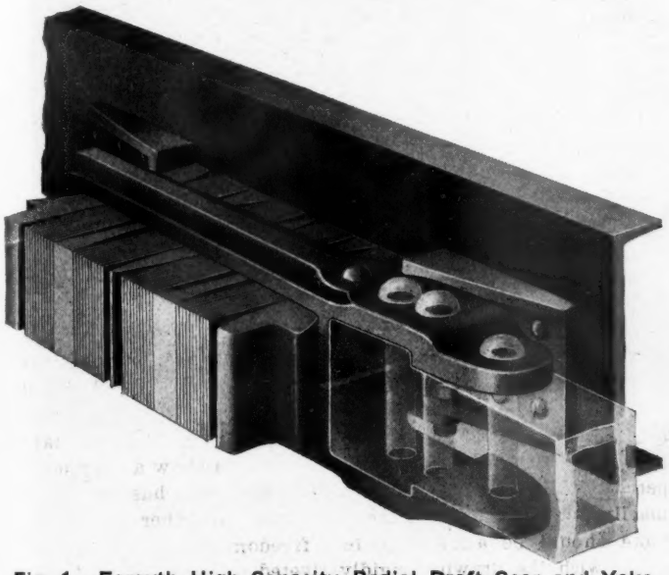


Fig. 1.—Forsyth High Capacity Radial Draft Gear and Yoke.

bearing surfaces) of the Forsyth gear automatically return not only the drawbar, but also the yoke to its normally central position; while at the same time permitting both under draft or buff on curves to swing freely into the line of draft or buff. A drawbar centering device, which engages the

Fig. 2.—Forsyth Radial Yoke.

drawbar at the carry iron is not practical in freight equipment, owing to the fact that it does not return the yoke as well as the drawbar to its normal position when the yoke has the clearance necessary to avoid shearing of its rivets.

The Forsyth end "radial" followers can be used with any standard draft gear, in which case their inner faces are made flat; and the Forsyth yoke can also be used with other draft riggings.

The Forsyth Brothers Company control and own the fundamental patents on this type of plate gear; on the radial feature and on the Forsyth yoke; in spite of which the prices of these devices are extremely reasonable. The Forsyth high capacity radial draft gear and cast steel yoke have been tried out in extensive and most severe service and have proved altogether satisfactory and accomplished the ends for which they were intended.

SIDE FRAMES AND SIDE BEARINGS.

As the weight and capacity of freight cars increase, the arch bar construction of the trucks becomes responsible for a considerable percentage of the delay to the car on the repair tracks, on account of the continual adjustment required and the replacing of broken or lost parts.

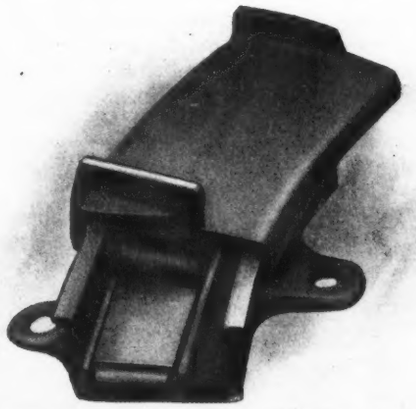
To replace this construction, the American Steel Foundries, Chicago, designed a cast steel side frame of the Andrews

Andrews Steel Foundries Side Frame.

type, which included in one piece as many parts of the arch bar design as were considered desirable, considering the delay to the car when worn or defective wheels were being replaced.

Frames of this design are being produced at the Granite City, Ill., plant of the American Steel Foundries at the rate of 1200 per day of 24 hours, and the accompanying cuts will give some idea of the appearance of the frames as they come through the shop, and of the facilities and capacity possessed by the American Steel Foundries for work of this character.

In addition to the regular types of Andrews side frame



Susemihl Side Bearing in Extreme Position.

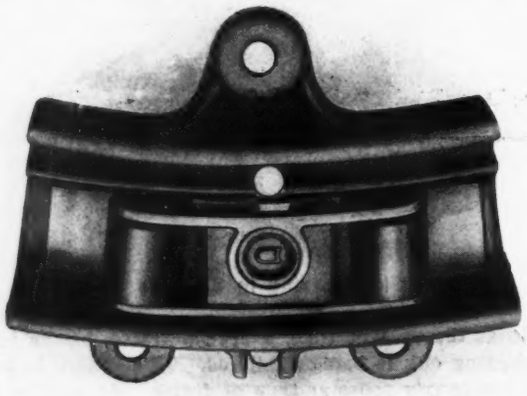
as made at the present time, a special frame, shown by the accompanying cut, is being exhibited. This design is known as this company's pedestal type of frame. As will be seen, it does away with tie bar and oil box bolts.

Several types of Susemihl roller side bearings are also being shown at the exhibit of the American Steel Foundries. These are of interest since they accomplish what has proven desirable in any design of roller side bearing, namely, the ability to act as ordinary side bearings in case they are broken or disarranged.

About 250,000 of these bearings are in service on 75 different railways and private car lines and the opinion expressed by those who have had the most experience is that they pay for themselves in one year through saving of flange wear.

Interior of Granite City Plant; American Steel Foundries.

A practical and successful roller side bearing must have some effective means of confining the rollers to prevent them from being lost, and also to prevent friction between the rollers themselves. It is also necessary to employ some method of compelling the rollers to roll and of bringing them back again to their proper position between the bearings even when unloaded. The Susemihl bearing has been designed to meet all these conditions and in the simplest possible form, consisting of two hardened steel rollers fitted in



Susemihl Side Bearing Carriage and Rollers.

a carriage and operated between top and bottom hardened steel plates. In case the car becomes separated from the truck bolster, the side bearings remain intact with the truck bolster and it is impossible for any of the parts to fall out or become misplaced.

The American Steel Foundries furnish Susemihl roller side bearings in a variety of designs to suit truck requirements when used under tenders, passenger equipment or freight cars.

THE ILLUMINATION OF A LOCOMOTIVE ERECTING SHOP.

The importance of an abundant supply of light for locomotive erecting shops is generally recognized. The fact that the materials upon which the work is to be performed are in varying positions, and of widely different sizes and conditions, necessitates a general illumination with as complete absence of shadows and as nearly uniform intensity as it is possible to obtain. With windows rising to a height of nearly 40 ft. on each side, and with an extensive skylight over the center, the means of securing this condition with natural light is provided as completely as structural necessities will permit.

The artificial lighting problem in this case is unquestionably to produce as nearly as possible the conditions of the daylight illumination.

On account of the traveling cranes the location of the lighting units is practically limited to a position above the truss chords of the roof. Furthermore, practically no assistance can be expected, either in the way of additional diffusion or increase of intensity, from reflection from side walls or ceiling. The large area of glass has but little reflecting power, and the walls and ceiling are too begrimed with smoke to afford any assistance worth reckoning.

The problem then narrows itself down to providing direct general illumination of sufficient intensity to enable the workmen not only to see to handle the heavy materials, but also to distinguish fine details, as in reading scale divisions, scriber and prick-punch marks, and the cutting edges of tools.

In the case of the Pennsylvania Company's erecting shop at Fort Wayne, the problem was solved by the installation of Cooper Hewitt lamps. The type used is the double tube pattern (Type H H), shown in Fig. 1. The tubes are each 1 in. in dia. by 20 in. long, and consume normally 192 watts per

Fig. 1.—Type H H Cooper Hewitt Lamp.

tube, or 385 watts per lamp. The lamp is provided with a white enameled steel reflector placed above the tubes. The location of the lamps is shown in the diagram, Fig. 2, being staggered between the roof trusses on either side 20 ft. apart.

Three tracks are run lengthwise through the shop, the center one traversing the entire length; the two outside tracks, placed 15 ft. from the walls to the center of the track, run through the east half of the shop only.

Illuminometer readings were made in a section of the northwest corner of the building. This was chosen as being freer from high machinery and obstructions than the other end. This quarter of the shop was divided into thirty-two equal rectangles, each 20 ft. x 19 ft. 9 in., in the center of each of which a reading was taken at a plane 5 ft. above the floor, the average height of the eye when standing. In no position did any of the machinery intercept the direct light from the lamps to the illuminometer.

The reading* at each station is shown in the following table:

Station.	Foot-candles.	Station.	Foot-candles.
1	.208	17	.313
2	.392	18	.545
3	.495	19	.700
4	.593	20	.781
5	.650	21	.745
6	.570	22	.808
7	.483	23	.747
8	.440	24	.693
9	.495	25	.750
10	.588	26	.786
11	.701	27	.830
12	.563	28	.772
13	.581	29	.795
14	.686	30	.820
15	.805	31	.855
16	.690	32	.825

*Measurements by Sharp Millar portable photometer.

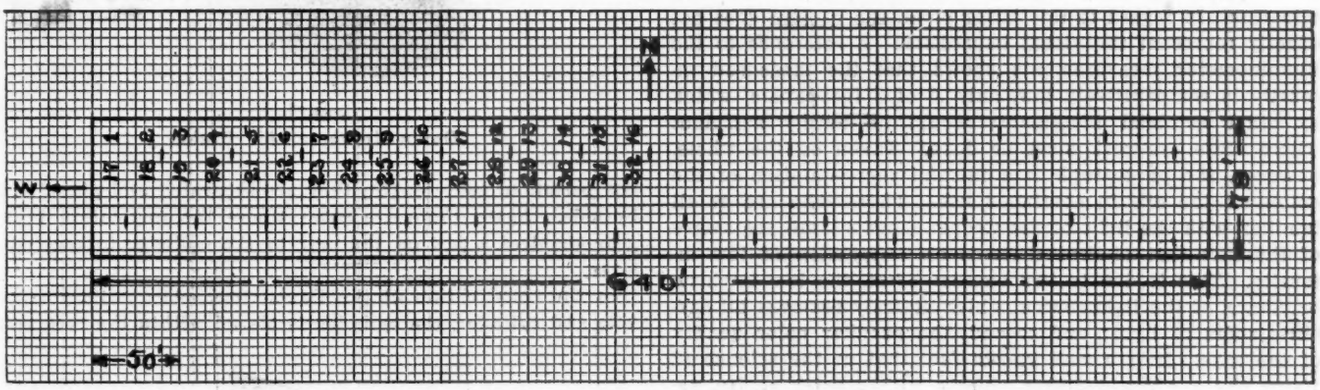


Fig. 2. Floor Plan of Shop, Showing Location of the Lamps and Positions of Test Stations.

Figure 3.
Center View (Night Exposure); Erecting Shop.

The following is a summary of the conditions, and the data obtained from the tests:

Length of shop	640 ft.
Width of shop	79 ft.
Height of shop	60 ft.
Height of lamps	40 ft.
Type of lamps	H H Cooper Hewitt
Number of lamps	32
Total area in square feet	50,560
Average watts per lamp	420.9
Total watts	13,469
Watts per square foot	.266
Average foot-candles	.647
Watts per square foot per foot-candle	.411

In considering the above figures careful attention should be given to the accompanying photographs.

Figure 3 is a night view taken from the east end. The fact that no reflection is obtained from side walls and ceiling is plainly indicated. A careful scrutiny of this picture brings out more important facts in regard to the artificial illumination than can be expressed in any tabulated figures. The clearness with which all details are shown, even underneath boilers or obstructions, by the artificial lighting is truly remarkable, and does not suffer by comparison even with the very complete daylight illumination.

Figure 4 shows a side track about 150 ft. from the east end of the shop, and the uniformity of illumination and the visibility of objects in the shadows.

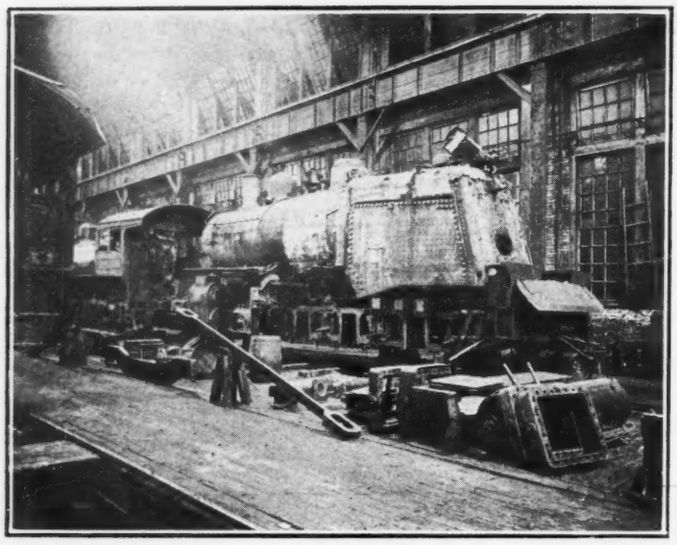


Figure 4.
Section of Erecting Shop, South Side.

Figure 5 shows a section of the shop where heavy machine tools are in use. The distinctness with which all marks, as well as the cutting points of the tools, can be seen, is particularly worthy of note.

In all of the photographs shown there is the appearance not only of uniformity and distinctness, but of brilliant illumination. In regard to this latter point, the camera does not exactly represent the visual impression. A reference to the illuminometer measurements shows that the measured intensity is comparatively low, only .6 of a foot-candle, which by other artificial illuminants would be hardly sufficient where close eye-work must be done. Taken on the whole, however, the photograph is a faithful representation of the action of the eye in continued use. Those who are at all familiar with the light of the Cooper Hewitt lamp are aware of the fact that at first there is an impression of low intensity. This is due to two causes: First, the low intrinsic brilliancy of the light-source, which entirely removes all dazzling spots of light; and second, the peculiar color quality of the rays. It is a well known fact that in the science of vision the eye distinguishes objects with greater acuity, especially at the lower intensities, with bluish-green light than with yellow light. After the first impression of gloom has worn off the eye follows its normal course of rendering distinct impressions under the apparently lower intensity. It is doubtless for this reason largely that the light of the mercury arc is less fatiguing to the eyes than that of sources which produce a large amount of red and orange rays.

Figure 5.
Wheel and Tire Shop, North Side.

DAVIS UNIVERSAL AIR BRAKE.

The Davis Universal air brake, herewith illustrated, is intended, as it's name "Universal" implies, to be used in any of the positions and combinations in which standard air brake apparatus is used today, and in several positions in which it is not possible to use present devices. In practice today it is common to use the auxiliary reservoir and brake cylinder bolted end to end, and where the car construction does not permit of such length, they are separated and placed side by side. Again there are cases where the foundation brake gear requires a jaw on the rear of the cylinder to receive a lever.

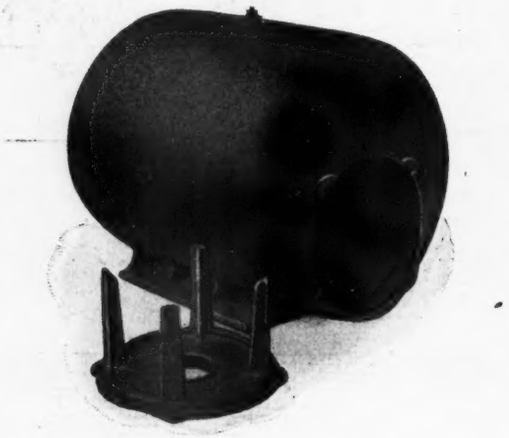


Fig. 1.
Davis Universal Air Brake.

In the construction of the Davis combined auxiliary reservoir and cylinder, the cylinder is placed within the reservoir,

Fig. 2.
Davis Universal Air Brake.

thereby restricting its length to that of the ordinary brake cylinder alone and in the case of the 10″ cylinder, the diameter of the whole apparatus is only 3½″ greater than the reservoir for the 10″ cylinder. The valve seats are so constructed that the triple valve is always vertical, no matter in what position the apparatus may be placed. It has fewer parts than that of any other air brake apparatus; cheaper to

manufacture; less expensive to apply to the car; requires no piping other than the connection to the triple valve; more economical in the use of air, and is quicker in the application of the brakes. The triple valve also can be placed in a more accessible position.

Fig. 1 shows front view of combined auxiliary reservoir and brake cylinder with non-pressure head removed.

Fig. 2 shows rear view of combined auxiliary reservoir and brake cylinder with brake lever jaw and valve seat cover removed. Valve seats exposed.

Fig. 3 shows rear view of combined auxiliary reservoir and brake cylinder with triple valve, brake lever jaw, and cover for side valve seat in place.

Fig. 3.
Davis Universal Air Brake.

The position indicated is one in which the apparatus would be bolted to the under side of the car body. Also in this position the triple valve can be bolted to the side valve seat and the rear seat then not in use would be closed with the cover.

This very interesting device, which was designed by Nathan H. Davis, president, is being exhibited by the Davis Solid Truss Brake Beam Company, Wilmington, Del., in spaces 414-16-18.

CHARCOAL IRON BOILER TUBES.

To one unfamiliar with the process of manufacture of charcoal iron boiler tubes, the exhibit of the Parkesburg Iron Company, Parkesburg, Pa., will be of interest. This exhibit, while including a number of samples of tubing subjected to different tests and which prove the ductility and strength of the iron, has, in addition, a series of views, arranged in a rotating cylindrical transparency, showing every step of the operation, from receipt of the raw material, consisting of carefully selected scrap, to the loading wharf, where tubes are shipped to all parts of the country.

Particular attention is drawn to the conversion of scrap into blooms, running 99.9 per cent pure iron; to the close surface inspection given to the skelp, as well as to the tube in all stages of manufacture; also to the views of the physical and chemical laboratories, where any defects in structure or any undue amount of chemical impurities are detected. The tube mill, the most recent addition to plants of this nature in the country, is included in the views to show the rapid transformation, by properly designed and electrically driven machinery, from skelp to finished tube.

LIMA LOCOMOTIVES FOR THE OLIVER IRON MINING COMPANY.

The accompanying illustration shows one of two locomotives built by the Lima Locomotive & Machine Company, Lima, Ohio, for service in the Eveleth mine of the Oliver Iron Mining Company, at Eveleth, Minn., where they were delivered on May 13.

The locomotives are now operating on a very rough and uneven road with grades from 2 to 5 per cent and sharp curves. Each engine handles four 72-ton loads.

Following are the general dimensions and special equipment used:

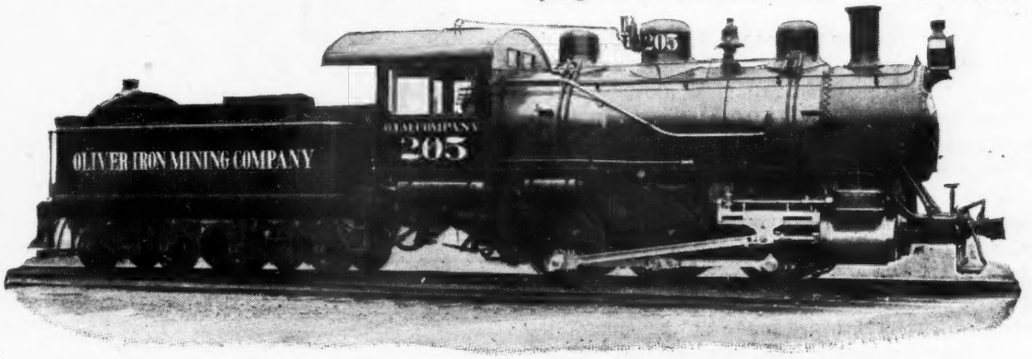
Type of locomotive	0-6-0-8
Weight on drivers	128,000 lbs.
Cylinders	19 in. x 26 in.
Diameter of drivers	50 in.
All tires flanged	6 in. wide
Wheel base, driving	11 ft. 0 in.
Wheel base, total, engine and tender	40 ft. 2⅝ in.
Boiler type	Radial stay
Boiler diameter at front	67 9-16 in.
Boiler diameter at rear	180 lbs.
Boiler working steam pressure	7014 in.
Boiler built and tested for	190 lbs. pressure
Tubes, number	190
Tubes, outside diameter	2¼ in.
Tubes, length	10 ft. 6 in.
Firebox, length	96 in.
Firebox, width	33 in.
Heating surface, firebox	146.18 sq. ft.
Heating surface, tubes	1165.56 sq. ft.
Heating surface, total	1311.74 sq. ft.
Grate area	22 sq. ft.
Water capacity	4,000 gals.
Coal capacity	7 tons

Ratios.

Weight on drivers ÷ tractive effort, 4.45.
Tractive effort ÷ diameter of drivers ÷ heating surface, 1,094.
Heating surface ÷ grate area, 59.6.
Firebox heating surface ÷ total heating surface, 11.1 per cent.
Weight on drivers ÷ total heating surface, 97.58.
Total heating surface ÷ displacement, two cylinders, 155.
Grate area ÷ displacement, two cylinders, 2.58.

Special Equipment.

Boiler lagging	H. W. Johns-Manville Co.
Brakes	Westinghouse combined automatic and straight air
Brake beams	National
Brake shoes	Streeter, steel back
Bell	National Tube Co., steel
Bell ringer	Golmar
Blow-off valve	National Tube Co.
Couplers	Climax
Draft gear	Farlow
Headlights	Dressel
Injectors	Nathan No. 9 simplex
Injector checks	Hancock
Journal boxes	Kensington
Lubricators	Nathan
Pop valves	Crosby
Metallic packing	Reliance
Springs	Union Spring & Mfg. Co.

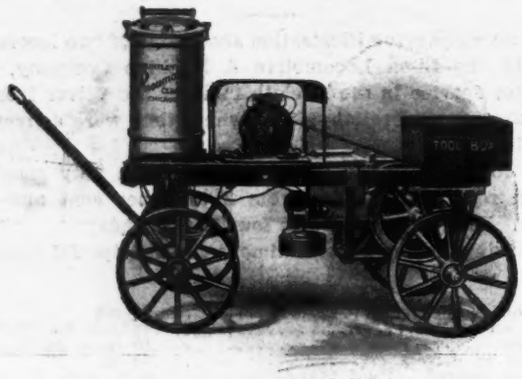


Lima Locomotive; Oliver Iron Mining Company.

PORTABLE ELECTRIC GENERATOR.

The Duntley portable electric generator consists of a gasolene engine and a generator carried on a substantial truck. the outfit complete weighing 500 lbs. The generator proper is a Burke direct current, 10-in. height by 18-in. wide, to be supplied with either 110 or 220 volts of electricity. These generators will operate all sizes of cleaners made by the Duntley Manufacturing Company, Chicago. With one No. 0 or two No. 1 machines, the suction developed by this generator is said to be the same as that developed by operating the cleaner from the regular electric light circuit.

The equipment of the generator consists of a switchboard



Duntley Portable Electric Generator.

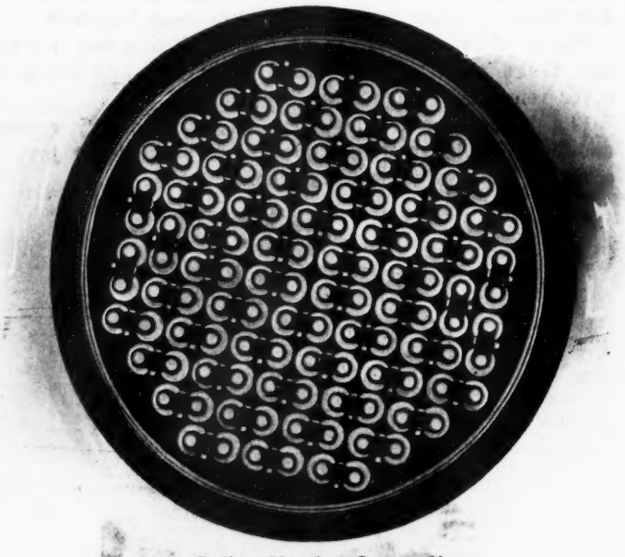
and two wall sockets for connecting cleaners or other apparatus. The generator is covered and well protected, so that it may be used out of doors. The generator is belted to the gasolene engine, although this belt may be removed and the engine adapted to other uses. It is claimed for this engine that it is easy to operate and simple in construction; and that one gallon of gasolene will run it for a period of 10 hours. A gasolene tank suspended in the center of the frame or truck just beneath the tank has sufficient capacity to operate the machine about five hours. The frame or truck is made of solid oak, thoroughly seasoned and is ironed and bolted to make it secure. The apparatus is being adapted to use in furnishing electric power for rail bonding work, screw spike driving, etc. The outfit is, for this work, mounted on a standard gage M. C. B. truck to permit easy transportation along railway lines.

NEW ELECTRIC BOILER.

When the trains drawn by steam locomotives reach the electric zone of the New York Central & Hudson River, an electric engine is used to take them into the Grand Central Station at New York. Some difficulty has been encountered in properly heating the trains after the steam locomotive is cut off, and several types of boilers have been designed, using coal, oil or electricity.

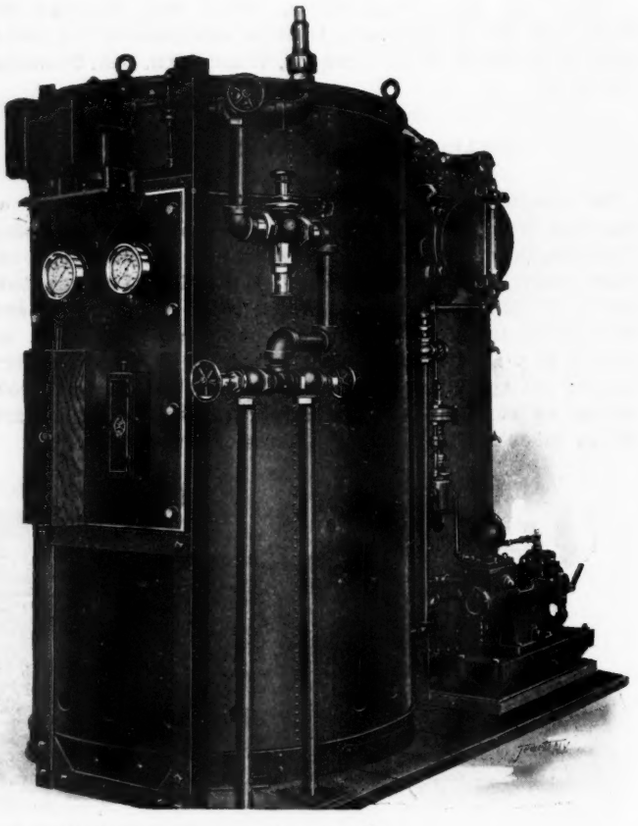
The Consolidated Car Heating Company, New York, has designed a type of steam boiler and electric heating apparatus by which electricity from the third rail is employed in producing heat to generate steam for heating the entire train. A form of electric heating tube is placed within the flues of a multitubular steam boiler. The water does not come in contact with the heating element and no electrolytic action can take place. The complete submergence within the boiler, of the tube containing the heating element compels all of the heat to pass into the water. Thus a high efficiency in the transfer of heat is evidently secured. The connections between the electric heating tubes are made at the end of the boiler and in the space formed at the ends within the projected apron formed by the boiler sheet and the end cover.

An automatic apparatus is provided by which automatic regulation is obtained. A steam pump and a water tank are mounted as a part of the electric boiler set. This pump is automatically controlled by a governor which maintains



Electric Boiler Header Connections.

the proper water level. Should the water in the boiler be lowered about 1 in. below the low water mark, the regulating apparatus cuts off the electric current and the boiler ceases to generate steam. This emergency apparatus also prevents closing the circuit through the heating elements until the proper water level in the boiler has been restored. The current leading to these heating elements is also automatically controlled, being set to shut off at 100 lbs. steam pressure maximum and turned on at 94 lbs. minimum.



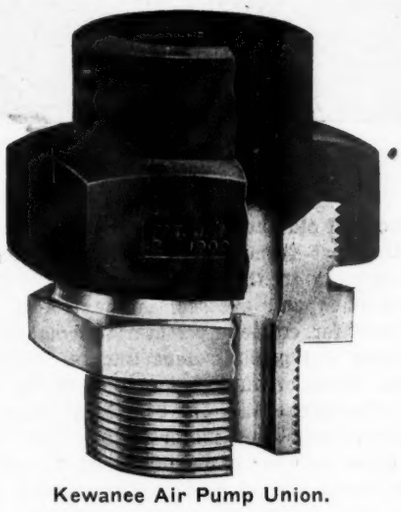
Electric Boiler.

Air is employed as a means of control between the automatic devices and the heating circuits. The main circuit cannot be closed until the air pressure necessary to effect control of the circuit has been produced in the main reservior. This apparatus requires but little attention on the part of the engineer. It is compactly built, thoroughly braced and every part made substantially. It occupies a space in the middle of the cab.

KEWANEE AIR PUMP UNION.

Serviceable locomotive equipment is engaging the attention of a large number of the mechanical men in attendance at the conventions, and for this reason an illustration and a few words on the Kewanee air pump union will be of general interest.

The Kewanee air pump union was especially designed for severe locomotive service. It has all the principal advantages of the Kewanee principle: a brass to iron thread connection, and brass to iron ball joint seat. With this construction,



Kewanee Air Pump Union.

corrosion in the thread connection is said to be prevented, thus making a readily movable joint, even after long service. The junction of a soft and hard metal in the ball joint seat makes an air-tight seal without the use of a gasket. Not alone does the Kewanee air pump union require no gasket, but it is practically certain that each union will make an air-tight joint, for the reason that each one has been individually subjected to a test of 100 lbs. compressed air pressure under water.

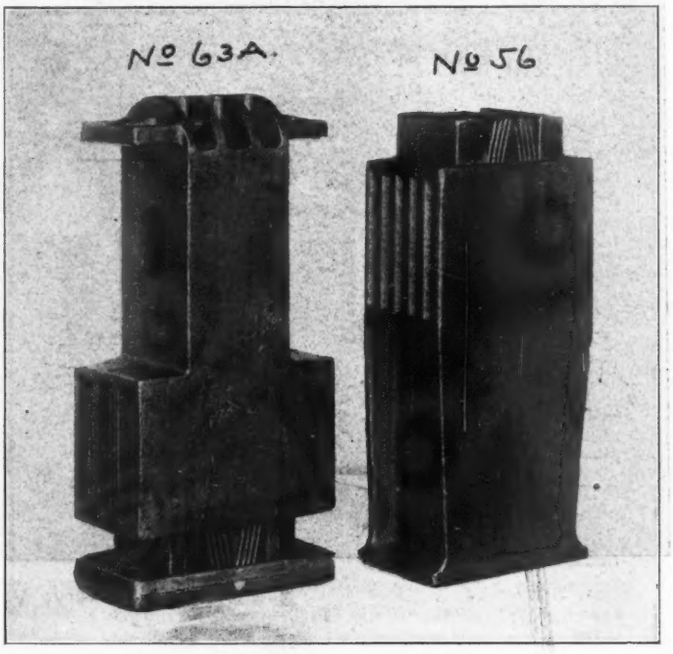
The National Tube Company, Pittsburgh, Pa., is the manufacturer of this latest type of Kewanee union.

FRICTION DRAFT GEARS AND BUFFERS.

The Gould Coupler Company, Depew N. Y., exhibits its friction draft gears for freight and passenger equipment, as well as its friction buffers arranged for steel platform end sills for steel passenger cars.

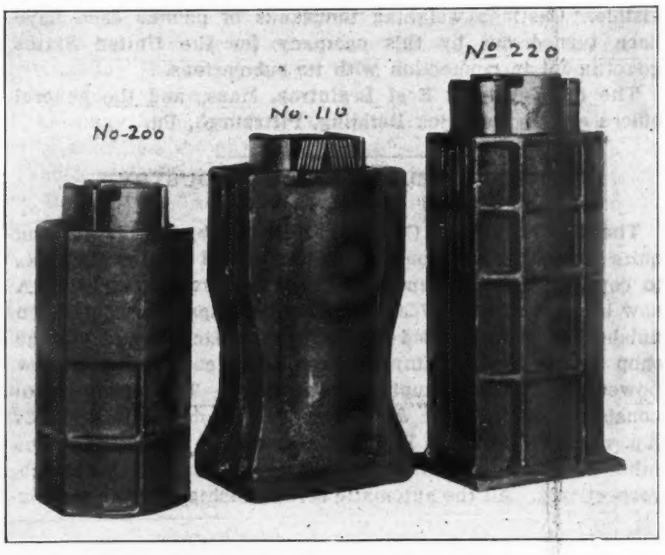
These friction gears embody the same principle, a combination of coil release spring and flat plate springs operated laterally by drop-forged, case-hardened wedges. Modifications are provided for the required different applications. In all these friction devices, the containing casing or housing has no direct wear as drop-forged wedge plates in contact with the housing take all the frictional wear. This friction gear is simple, easily taken apart and re-assembled without instructions. It also has a decided advantage in the simple manner of renewing the capacity when worn or slack by inserting a plate filler adapted to take up the amount of slack between the two sets of leaf springs.

The capacity of the friction buffers can be reduced by the removal of the desired number of leaf springs, after which plate shims are put in their places. Their capacity can also



Passenger Friction Draft Gears.

No. 63-A.—1¾ in. travel.
No. 56. —2¼ in. travel; for all-steel cars.



Freight Friction Draft Gears.

No. 200.—2½ in. travel; 150,000 lbs. capacity.
No. 110.—2 in. travel; 170,000 lbs. capacity.
No. 220.—3½ in. travel; 320,000 lbs. capacity.

be increased by the insertion of additional leaf springs to the limit of the permissible space allowed. The principle of this type of friction device allows of its many modifications and to its adaptability.

VANADIUM BRONZE AS A BEARING METAL.

A very interesting demonstration of the toughness, ductility and wearing qualities of Victor vanadium bronze is shown at the exhibit of the Vanadium Metals Company, Pittsburgh, Pa. Although but recently introduced to the railway field, this company has been making rapid progress. Heretofore the marine and automobile industries have provided a market for this company's product, but the successful results obtained

Interior of Foundry; Vanadium Metals Company.

by those railways that have tried Victor vanadium bronze for different purposes augurs well for the future.

The illustration shown herewith covers only one-half of the foundry floor, the furnaces, crucibles, etc., not being visible. Castings weighing thousands of pounds each have been turned out by this company for the United States government in connection with its submarines.

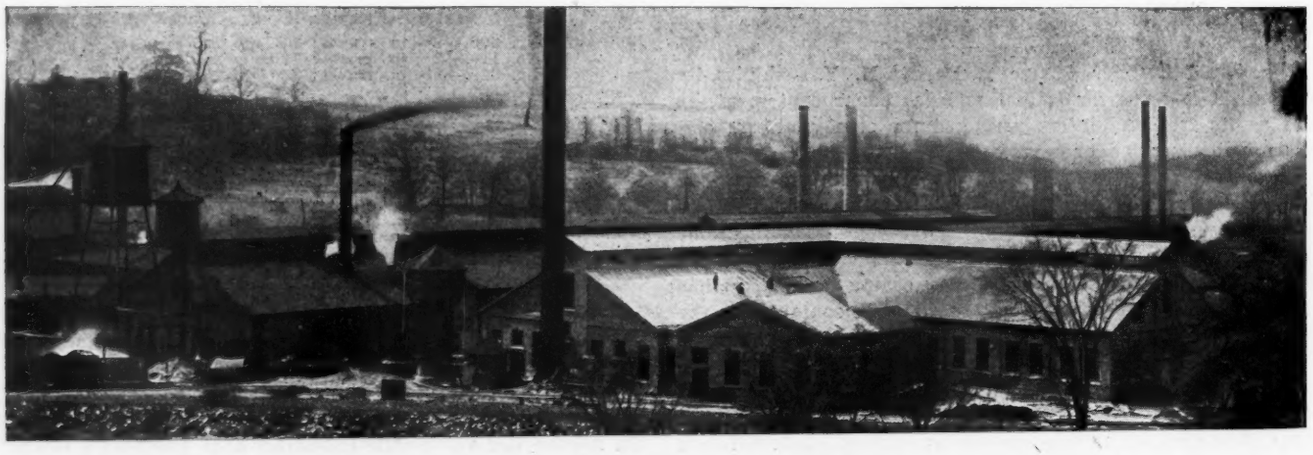
The foundry is at East Braintree, Mass., and the general offices are in the Frick Building, Pittsburgh, Pa.

THE FLEXIBLE STAYBOLT INDUSTRY.

The Flannery Bolt Company, Pittsburgh, Pa., is making quite extensive additions to its factory at Bridgeville, Pa., to cope with the demands for the Tate flexible staybolt. A new brick shop with 17,300 sq. ft. of floor space has just been finished and will be used as the forging, packing and storage shop for bolts and staybolt iron, also comprising a new power plant and stamping department. The power plant consists of 3 Babcock & Wilcox water tube boilers of 337 h.p. each, two 4-valve Ball engines, one of 200 h.p. and the other of 400 h.p., with generators of 125 and 250 k.w. each, respectively. All the automatic screw machines in the machining department of old shop and tool room are to be run with lines driven direct from motors; also the blower exhaust system for cooling in the new forge shop. The lines for hammers, punches and presses, motor trolley and electric hoists are used for conveying material from the forge shop to the shipping and packing departments. Eight motors of 45 h.p. each, three of 13 h.p. and one of 7½ h.p. will be distributed throughout the plant and all main line shafts will be discontinued and motor driven jack shafts used, covering a given number of machines which will be used as independent units, so that any department can be run separately.

A 700-ton iron rack is built in the forge shop for staybolt iron. This iron is taken from the cars, loaded on heavy trucks which run on 80 lb. rails to a 10-ton copper dealers' scale with type registering beam, and an accurate weight record obtained; it is then placed in whatever rack is designated for the brand of staybolt iron used.

The entire plant when finished will be especially equipped to handle each part of the Tate bolt in a systematic manner. The sleeves department, cap department, bolt department and tool department will each run independently as a part of the whole system in turning out the complete product, thus



Factory of the Flannery Bolt Company.

serving the purpose to maintain for each department a high grade of workmanship throughout.

The Tate flexible staybolt is now in service on 150 railways. Approximately 3,000,000 Tate bolts are in use and many of the first customers have adopted and standardized the Tate bolt for all locomotives in high pressure service and have provided installations on their blueprints sufficient to cover the breaking zone of the rigid staybolt, some engines taking 360 Tate bolts to the engine, while others run as high as 1,600 to the engine.

According to the report of the manufacturer, while it has found a few of the Tate bolts broken, such were due to the fact that sufficient area of the sheet had not been covered with Tate bolts to eliminate the breakage of the rigid bolts, and in some instances applications were too tight, especially in the throat sheet and rigid sections of firebox, where the longitudinal stress on the bolt, due to differences of expansion of outer shell and fire box, exceeds the stress due to pressure. When a sufficient area is covered, no breakage of either rigid or flexible bolts is found, the purpose being to cover such sections of all fire sheets where deflection of rigid bolt—due to expansion—is too severe to enable the rigid bolt to withstand the vibratory stress or repeated bending without fatigue and final rupture. When sufficient area is once known and covered by the Tate flexible stay breakages will stop. The fire sheet will tend to more naturally withstand expansion, without bending and cracking, preventing seam leaking and buckling, thereby adding to its life and service value of the complete firebox.

The tendency to install greater numbers of Tate bolts to high pressure engines is due to the remarkable showing of locomotives which were provided with a full installation up to the crown line, having run through a period of service sufficient to prove the value of the Tate bolt from a comparison of the rigid bolt, wherein cost of maintenance for staybolts for the flexible were insignificant against repeated excessive charges for the rigid bolt renewals and side sheet patching.

The Flannery Bolt Company has issued some interesting literature on the staybolt subject, and lately issued a neat catalog of the Tate flexible staybolt.

The organization of the company is as follows: James J. Flannery, president; J. C. Gray, vice-president; Joseph M. Flannery, secretary; H. A. Neeb, treasurer; B. E. D. Stafford, general manager; F. K. Landgraf, shop superintendent. The selling agency is in the hands of J. Rogers Flannery & Company, Pittsburgh, Pa. George E. Howard is eastern representative; W. M. Wilson, western representative; Commonwealth Supply Company, Richmond, Va., southeastern representative; and Tom R. Davis, mechanical expert.

LANDIS PLAIN SELF-CONTAINED GRINDING MACHINE.

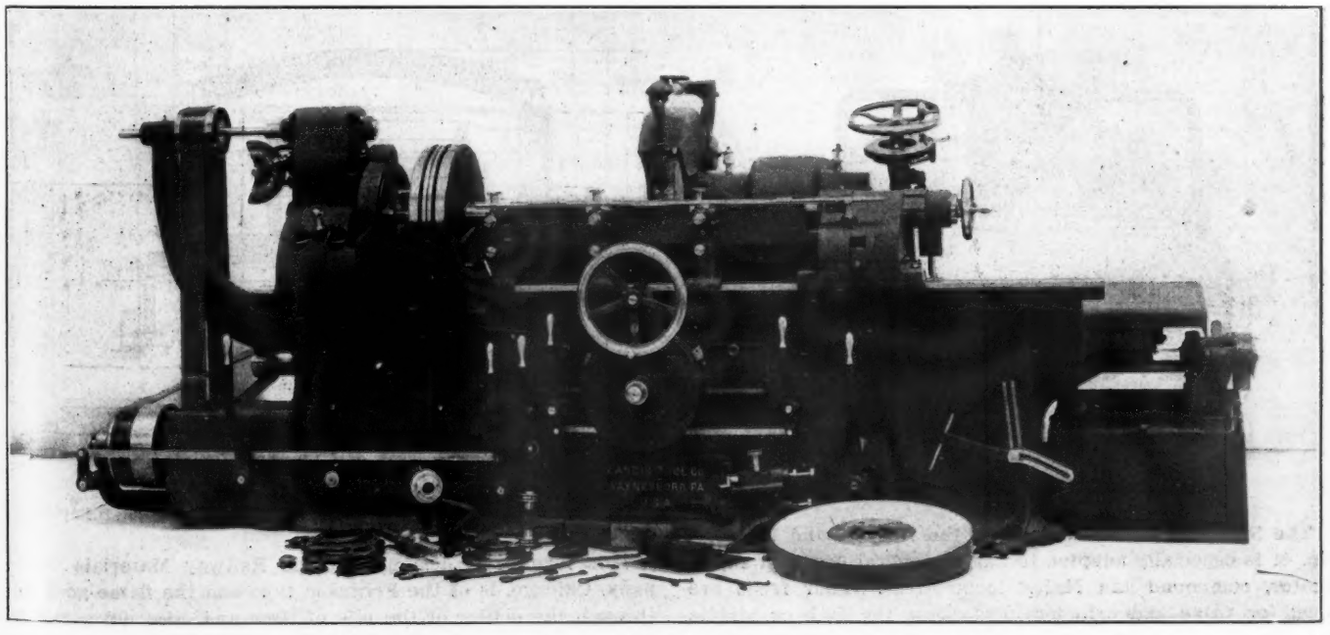
The machine shown herewith, made by the Landis Tool Company, Waynesboro, Pa., embodies the Landis principle of traversing the grinding carriage, which is a fixed weight. The advantages claimed for this principle are: Unvaried duty imposed at all times on the carriage driving mechanism, insuring accuracy of traveling distance between points of reversal; uniform and positive lubrication of the ways; a rigid and stationary foundation for the work; no overhanging of the work table, it being supported throughout its entire length by the main column of the machine, to which it is firmly clamped, thus avoiding vibration. This is a feature which is considered essential to rapid and accurate grinding.

This machine is designed as a self-contained one, having no overhead counter shaft, although when desired to be driven from a line shaft an auxiliary shaft with tight and loose pulleys and a main pulley for belting to the machine are used.

The Landis 16-in. x 72-in. plain self-contained grinding machine may be arranged for handling work with projections requiring a large swing, such as piston rods, valve yokes, crossheads, crosshead pins, engineer's valves, link block plates, knuckle pins, etc. A piston rod from which .025 in. of metal is to be removed may be ground in about 15 minutes; a valve yoke, from which the same amount of metal is to be removed, may be ground in about 10 minutes, and cast iron crossheads, 13 in. in diameter, with shoes 5 in. wide and 12 in. long, having ground guide bearings which allow but .001 in. variation, requiring the removal of 1/32-in. depth of metal, may be ground in 15 minutes.

Of the many kinds of work that can be handled by Landis grinding machines the foregoing covers but a few. Many railway shops undoubtedly have classes of grinding work with which this company has not as yet come in contact, and from these especially it solicits correspondence. If such parties will send drawings or samples of any particular kind of work, the company will send estimates on the time required and show just what can be done on these machines.

The following advantages of finishing on these machines are

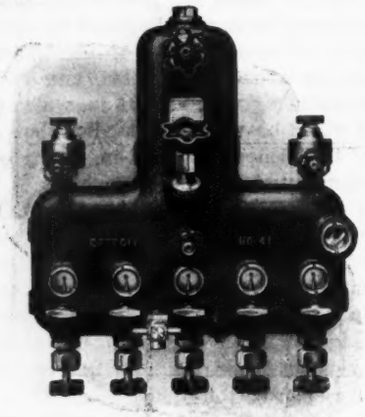


Landis 16-in. x 72-in. Plain Self-Contained Grinding Machine With Gap.

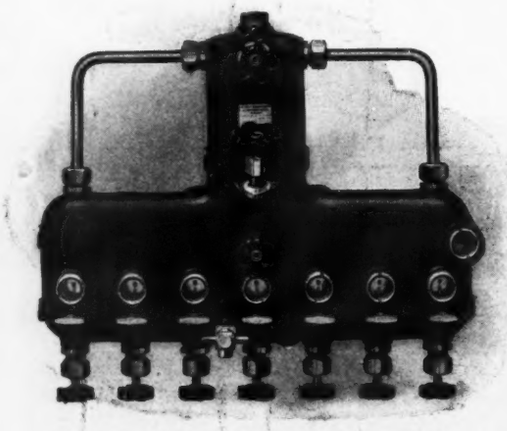
claimed: No finishing cuts on the lathe necessary; no skilled mechanic required, as the machine does accurate work; both headstock and footstock have dead centers insuring trueness; no filing or polishing necessary; all drilling and milling can be done before parts are ground; any change of work or traverse speed may be obtained without changing of belts, gearing or clutches and made while machine is in operation; all levers are within easy reach of the operator, and from the front of the machine; an abundant supply of clean water is provided; the grinding wheel can be dressed in any position of its travel without removing the work; the grinding wheel tarries at points of reversal for grinding clean at shoulders, and the period of tarry can be regulated to suit the work; the operator has an opportunity to make time, the wheel feed stopping automatically when the work has been ground to size, permitting him to prepare work for the next operation; separate work and grinding wheel traverse speeds, permitting a slow work speed and a fast traverse speed, which is necessary to remove stock rapidly.

DETROIT LUBRICATOR COMPANY'S EXHIBIT.

The Nos. 41 (5-feed) and 61 (7-feed) types of Detroit Bullseye locomotive lubricators exhibited at Booth No. 15 by the Detroit Lubricator Company, Detroit, Mich., are striking features of a generally interesting and exceedingly instructive display under the direction of the company's traveling engineer, A. D. Homard.



Five-feed Detroit Bullseye Lubricator.



Seven-feed Detroit Bullseye Lubricator.

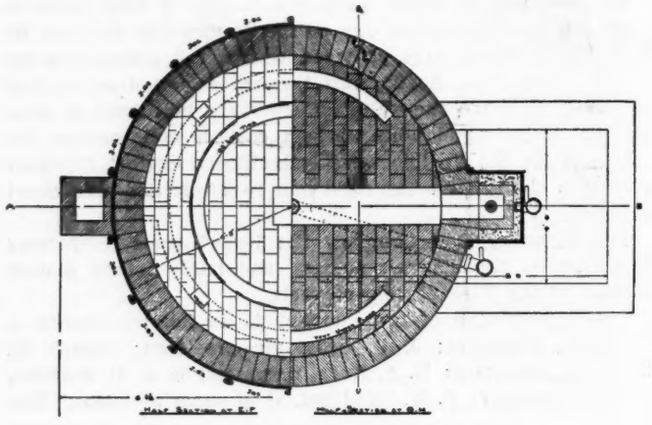
The illustrations herewith show the Nos. 41 and 61. The No. 41 is especially adapted to and in general use with superheater, compound and Mallet locomotives. Four feeds are used for valve and cylinder lubrication, the fifth or middle feed being used with the air pump. Four automatic steam chest plugs are furnished with this style, and the middle or air pump feed is equipped with a choke at the lubricator. Where any different arrangements of the chokes are desired in this type of lubricator, specifications to that effect can be drawn.

The No. 61 lubricator is also especially adapted to use on superheater locomotives where it is desirable to introduce the oil at both ends of the piston valve or any service requiring 7-feeds. Two can be directed to the expansion piston rods if desired. Six automatic steam chest plugs are furnished with each lubricator of this type, and the seventh or middle feed is intended for the air pump and is equipped with choke at the lubricator. Specifications for different arrangements of chokes in this type are also possible.

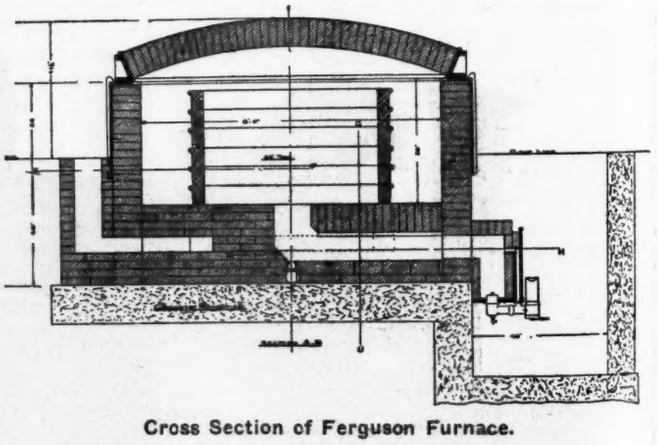
A complete display of the company's full line of locomotive lubricators from a small 1-feed type up to the above described 7-feed type, with a general display of special features, attachments, including a transfer system for filling lubricators, completes an exhibit worth careful study.

TIRE FURNACE.

Some of the large locomotive shops, where several engines are handled daily, together with tire work for outside points, have given considerable attention to the question of handling tires. A section has been provided for this work, having a well drained fire-proof floor, a large jib crane and a tire



Sections Through Ferguson Furnace.

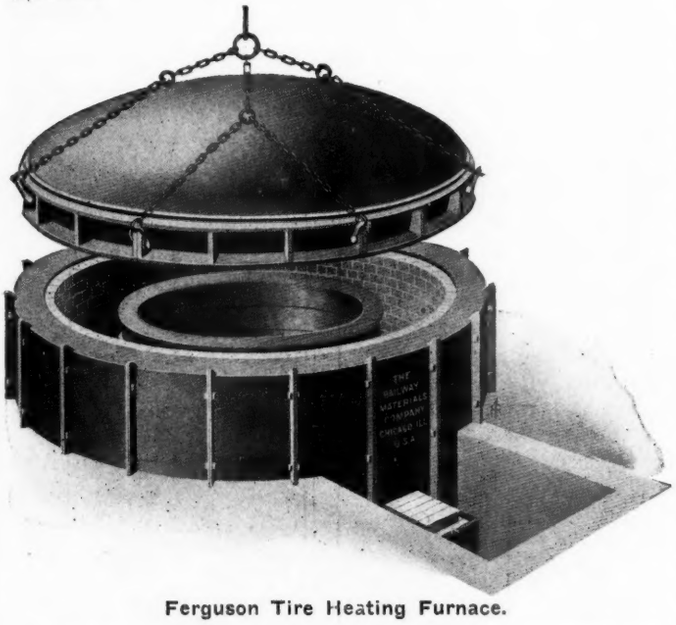


Cross Section of Ferguson Furnace.

furnace of the design illustrated, having capacity for either six or eight tires.

This furnace is designed by the Railway Materials Company, Chicago, is of the Ferguson type and the flame goes up through the center of the pile of tires and does not come in direct contact with the tire, insuring a uniform heat and

expansion. The greater part of the furnace is below the floor line of shop, enabling the operator readily to adjust a three-piece grapple hook to the top tire. The furnace will heat a set of tires in a few minutes; then they can be taken out as desired, the rest remaining in the furnace at a uniform temperature.



Ferguson Tire Heating Furnace.

The layout makes a clean, efficient method of handling tire work, insures a correct uniform shrinkage, and has many good features that should recommend it for large shops. The Philadelphia & Reading shops at Reading, Pa., the New York, New Haven & Hartford at Readville, Mass., and the Central of Georgia shops at Macon, Ga., are equipped with tire furnaces of this description.

LONG LIFE TO YOUR HOSE.

At booth 322 there is an exhibition of hose which every railway man interested in air brake equipment or signal line service should see.

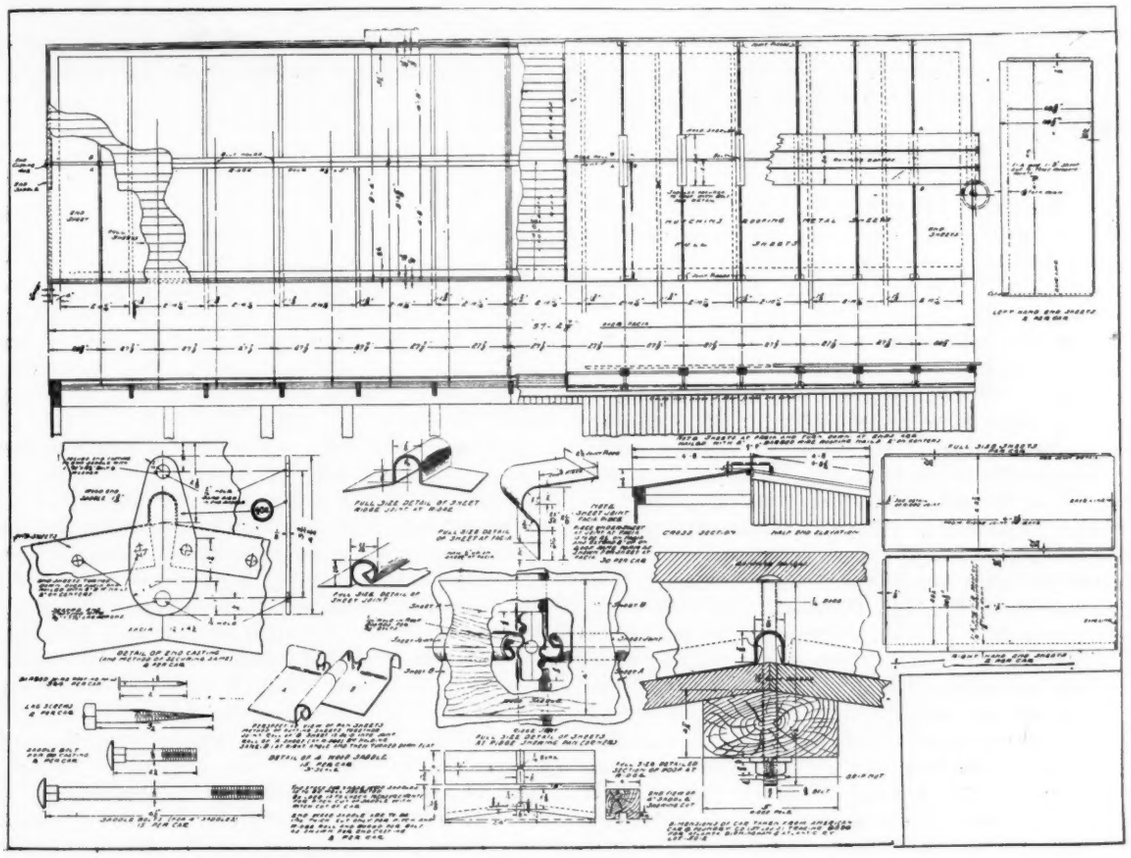
The Sprague flexible steel armored hose, made by the Sprague Electric Company, New York, is favorably known to many, but this is an opportunity for all the delegates to see its superior qualities. The Sprague Company's representative, Mr. Uhl, will be glad to explain its construction and show you why it cannot kink or chafe, and why the cost of hose is reduced. However, the cost of replacing hose is a small item compared with the annoyance, and often expensive delays, if not actual damage, due to hose failures. The construction of this hose is said to not only eliminate failure, but also to greatly increase the life of the hose. It will all be explained at the booth.

HUTCHINS OUTSIDE METAL ROOF, TYPE D.

The detailed drawing herewith shows the construction of the Hutchins outside metal roof, type D. Its principal feature lies in the fact that it is secured to the car without the use of malleable castings. The sheets are joined by the Hutchins rolled lock joints, which are proof against water and at the same time allow for the necessary flexibility. The roofing sheets are secured at the eaves by the Hutchins eave roll bead, intended to allow for the movement of the sheets without tearing them and to relieve the stress of the nails so that they will not pull out or through the roofing sheets.

This roof has been in successful service on a large number of cars for the past ten years.

The Hutchins Car Roofing Company, Detroit, Mich., manufacturer of this car roof, is exhibiting in space 431. This company is represented in Chicago by the Spencer-Otis Company, Railway Exchange, and in New York by the United States Metal & Manufacturing Company.

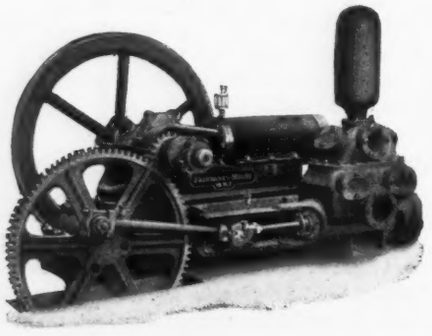


Details of Hutchins Outside Metal Roof, Type D.

COMBINED ENGINE AND PUMP.

The handling of water to the track tanks at the lowest cost is an important problem which seems to be very satisfactorily solved by the use of some style of internal combustion engine, built to use the cheapest fuel available.

The combined gasolene engine and pump illustrated herewith, and made by Fairbanks, Morse & Company, Chicago, is probably as extensively used as any other type of pumping engine. It has the advantage of being very compact, requiring little space and little attention. Their reliability and



Fairbanks, Morse Combined Engine and Pump.

"The first nine years this engine and pump practically durability is convincingly attested to in a letter from an engineer of maintenance of way of a large and well equipped road:

worked day and night, only shutting down often enough to oil up and make such general repairs as were necessary.

"During the last few years, on account of additional water stations on this division, it is not necessary to supply the same amount of water as formerly and the engine only averages about fifteen hours per day."

NEW PIPE THREADING MACHINE.

A new machine recently placed upon the market and which is especially adapted for railway shops is shown herewith. It is designed to thread and cut off pipes from ¼-in. to 2 in. inclusive.

The bed and headstock are cast in one piece, insuring the greatest possible rigidity and stiffness for the bearings. This is particularly necessary in this type of machine, as the operation of the chuck brings a constant strain on the front bearings of the main spindle.

It is equipped with an improved type of lever chuck, the gripping and releasing movement being accomplished while the spindle rotates. The opening and closing mechanism is powerful and the pipe can be gripped with but little pressure applied to the hand lever. The chuck holding the actual gripping parts is enclosed, thus avoiding all danger of catching the clothing of the operator. The three gripping jaws have a universal adjustment. All parts inside of the chuck are made of steel.

The machine has nine separate and distinct speeds, properly designed for threading both steel and iron pipe of the sizes within its capacity. It is driven by a single belt pulley, the nine speeds being obtained through the medium of a sliding gear and a clutch. All of the gearing is enclosed, but can be exposed for inspection by removing the cover. All of the shafts and gears are on the outside of the machine.

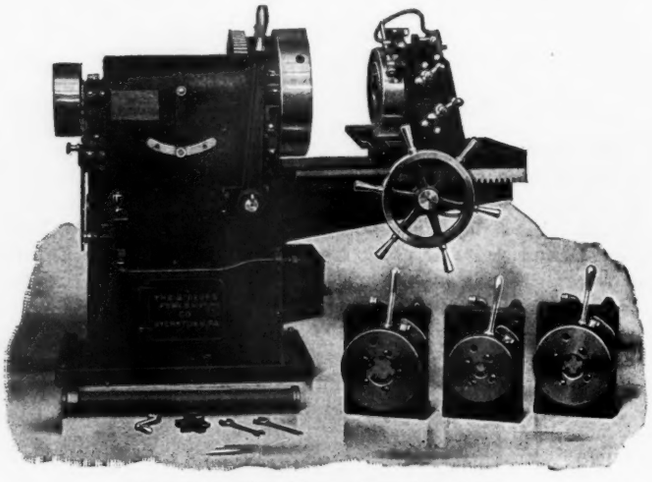
A set of bushings, extending through the spindle, are provided for supporting the various sizes of pipe. These through bushings prevent the operator from jamming the pipe against the jaws in the chuck when the machine is working on the smaller sizes, as when the chuck is open, the jaws are always outside of the bushing through which the pipe is placed.

An improved type of holders is used for making long and short nipples. These holders consist of three pieces of hardened tool steel. They are placed in the same chuck in which the gripping jaws are used, and open and close with the lever movement to release or grip the nipple while the spindle is rotating.

The die head slides on ways, and as it is free to slide, will accommodate itself to any eccentricity in the pipe, relieving the dies of strain and cutting an even depth of thread. It can be pushed to one side, so that it will completely pass the gripping chuck, and, in such position, the cutting-off tools can be brought up very close to the gripping chuck, thus cutting off the shortest possible piece of pipe.

By sliding the head out of the way the pipe can be inserted in the machine from either end equally well, thus giving the operator complete freedom of movement about the machine and enabling him to get his work out to the best possible advantage. When the head is pushed to one side the pipe can be pushed through the stand without dragging it over the dies and damaging them.

The die head is equipped with inserted interchangeable steel cams for taking the thrust of the dies and adjusting



Stoever Pipe Threading Machine.

them to their proper position. Hardened steel plates are also placed in the bottom of all the die slots to resist the wear of the constant contracting and expanding of the dies and keep the lead of all the separate chasers correct. The front face of the head swings open, so that when changing chasers they can be removed from the head at any position on the cams and others inserted. The operation is quickly performed and the interior of the head is exposed for cleaning or inspection.

Two cutting-off tools are used, both being operated by the same screw and handle. A universal adjustment is provided, so that both tools will always be cutting.

The oil pump is driven through a positive steel chain drive, direct from a constant speed pulley, giving a steady and constant flow of oil. A steel geared pump is used, which will deliver oil when running in either direction. The oil flows to the dies and cutting-off tools and then back into the bed of the machine and through strainers into the tank shown below the bed, from which it is drawn to the pump.

The machine can be equipped in two ways; with one universal head, in which all sizes of dies are used, or with a separate head for each size of pipe. The second equipment is very commonly used in jobbing shops, where they are called upon to change from one size of pipe to another very quickly. This interchangeable head equipment is also of advantage where a number of workmen are likely to use

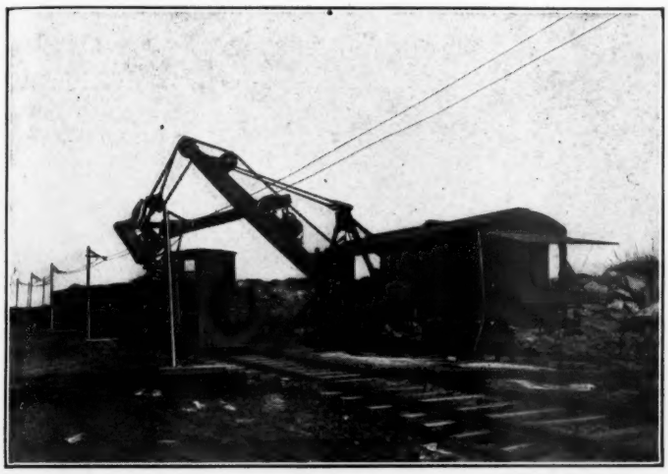
the machine. In such cases, the heads are always set to the proper gauge and require no adjustment.

The net weight of the belt driven machine, with one universal die head, dies, countershaft and bushings, is 2,500 lbs. The machine is manufactured by the Stoever Foundry & Manufacturing Company, Myerstown, Pa., with sales office at 140 Cedar street, New York.

DIAMOND TAPERED STEEL POLE.

Exhaustive tests recently made on this type of pole are said to have proven that for all classes of construction work where varied loads are constantly encountered, the Diamond meets the demand. Two separate concrete foundations were torn apart by two separate Diamond poles under loads of 3500 lbs. each and neither pole showed a permanent set after this performance.

For yard lighting, carrying bridge signal cords or, in fact,



Diamond Tapered Steel Poles Used in Construction Work.

wherever a pole is required, the Diamond is the strongest and lightest type in the market. The U. S. Metal & Manufacturing Company, New York, booth 337, who are United States agents for the Diamond pole, report a steady increase in sales and a large volume of inquiries from home and abroad, the southern countries being especially interested.

ADVANTAGES OF BRAIDED RUBBER HOSE.

The advantages which the Electric Hose & Rubber Company, Wilmington, Del., claim for its braided hose are many, among which are the following:

It is impossible for the fabrics to open and unwrap; the hose is very pliable, yet without any tendency to kink, and will withstand more pressure than the old style hose. Being made under pressure, all defects are developed during the process of manufacture.

The hose is lighter to handle, will last longer and will do more work than any other hose made. Pin holes, allowing air or liquid to escape through the tube and walls of this hose, are unknown, as all such defects are so developed during the process of manufacture that it is impossible for the hose with these defects to get to the user.

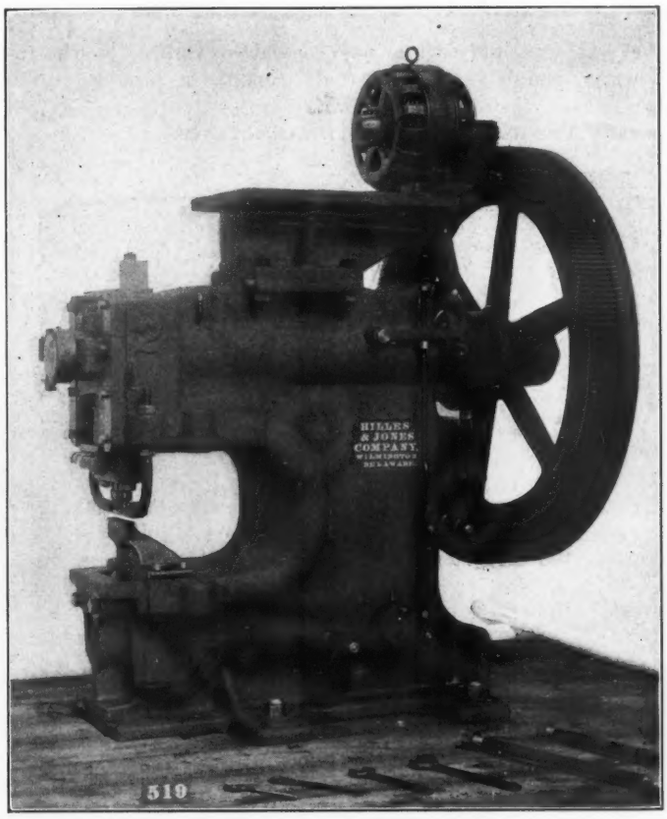
The hose is made under pressure from the inside, the same way that it gets pressure when in use.

The hose cannot be kinked, and is so pliable that it can be tied in knots and still get the same pressure at the outlet as at the inlet. This fact is being demonstrated at the Electric Hose & Rubber Company's booth, No. 378-380, and all visitors to the M. C. B. and M. M. conventions are cordially invited to visit this booth and see a practical demonstration of the above.

HIGH-SPEED PUNCHING MACHINE.

The accompanying photograph shows a high-speed punching machine with motor mounted overhead, the pinion on the armature shaft meshing directly with the teeth cut in the fly wheel.

The sliding head is fitted with three punches, each controlled by a separate hand gag, allowing three different diameters to be punched in a bar or plate at one pass and without loss of time in changing punches and dies. The machine is fitted with a removable stop for punching channels, I-beams, etc., in the flanges, and the design of die block, shown in position, permits the punching of small sections.



Hilles & Jones High-Speed Punching Machine.

The heavy bracket on top of the main frame, in addition to providing a substantial support for the motor, furnishes a base for attaching a self-contained crane.

This punch operates at a speed of 65 strokes per minute and has an improved automatic clutch designed particularly for this high-speed work. It is made by Hilles & Jones Company, Wilmington, Del.

PALMETTO PACKING.

During the last few years Palmetto packing has become popular with the mechanical departments of many of the railways of this country, because it has been found to be a packing that not only meets the exacting conditions of both the steam and air pressures, but also to be uniform in quality, which latter is said to be secured through the careful selection of high grade materials. No rubber is used in this packing, as the makers consider that that material has not sufficient endurance to make it serviceable under the temperature incident to present steam and air pressures.

The tendency to harden is overcome in Palmetto by a thorough process of lubrication, by which each strand has the lubricant forced into it before braiding.

The lubricant is carried from every particle of Palmetto to the rod, doing away with the use of oil cups, and reducing friction to a minimum. The makers of Palmetto packing

Round Palmetto Packing, Showing Strands.

have made a study of the requirements of railway locomotive service, and have adapted their packing in form suited to air pumps, throttle valves, Walschaert valve gears, as well as the shop engines, and small globe valves.

Palmetto Packings.

The representatives of Greene, Tweed & Company, New York, the manufacturers of this packing, will be glad to receive the delegates at their booth, No. 43.

CAST STEEL TRUCK SIDE FRAMES.

In these strenuous times the men who guide the destiny of a big railway system are very apt to judge all things by the balance sheet, and that form of equipment which shows the smallest annual maintenance cost is pretty apt to be in the highest favor.

Because of their practical elimination of maintenance charges, cast steel truck side frames and body and truck bolsters have, during the past few years, made great strides toward the goal of universal approval among mechanical men. In busy times cars are worth money, and the loss of revenue caused by having to take a 50-ton car out of service at such a time will more than offset, in the one instance, the slight additional cost involved by the use of the most modern type of construction available.

The Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., has made an enviable record with its bolsters and truck frames, types of which are shown in the exhibit, spaces 135, 137 and 139, and the company's representatives will be glad to furnish you with figures relative to their service records which they believe will convince the most skeptical that the use of these specialties is effective insurance against loss of revenue due to cars out of service in busy times.

FEED WATER TREATMENT.

Dearborn water treating preparations, manufactured by the Dearborn Drug & Chemical Works, Chicago, have been introduced on a great many railways in the East and South during the past year, and they are now said to be standard on more than 100 of the principal railways of the United States. The National Railways of Mexico buy Dearborn preparations in carload quantities, and the principal railway systems of Canada are fast putting Dearborn treatment in service on their lines. Within the past few months Dearborn water treating preparations are said to have been made standard on the three principal railways of Cuba.

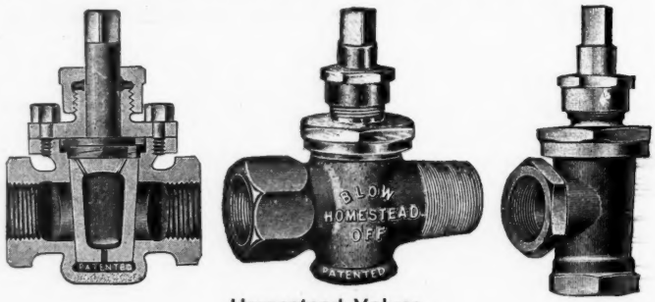
The Dearborn Company analyzes feed water supplies in its laboratories in Chicago, and compounds the treatment to suit. All of the waters on a division or bad water territory are considered together, and a minimum number of preparations furnished. It is usually possible to handle all of the waters on one division with one class of treatment, although two are often necessary. Preparations for removal of scale and prevention of leaks are applied to engine tender at terminals, and treatment to prevent foaming troubles is carried on the engine and applied to the water each time it is taken.

Water samples from China and Japan have been analyzed in the Dearborn laboratories, and Dearborn treatment is used on some of the railways of the Far East. Edward C. Brown, who is manager of the foreign business of the company, is spending a year in the Orient looking after Dearborn interests.

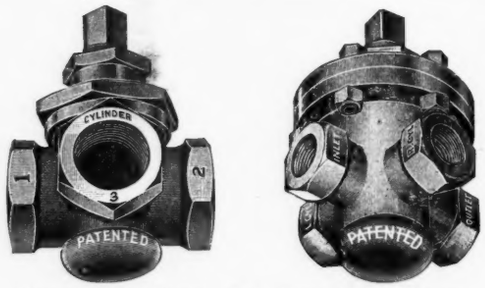
HOMESTEAD VALVES.

It has been the endeavor of the makers of the Homestead valve to produce one which would have superior wearing qualities. They are therefore made very strongly, with a mechanical principle of operation which tends to protect the most vital parts of the valve when in service.

It is made either of brass, of an iron body with brass plug, or of all iron; and in several different styles to meet special conditions of service. The locomotive blow-off valve is shown in one of the accompanying cuts. The Homestead valve has proven successful as a locomotive blow-off valve



Homestead Valves.



Homestead Three and Four-Way Valves.

and is used on many large railways. These valves are also applicable for use on stationary boilers, feed-water lines or for any high-pressure service.

The sectional view of the valve gives some idea of its construction; these same general principles being also carried out in the construction of the three-way and four-way valves shown. All are designed for pressures up to 1,000 lbs. or over, and they are said to be giving satisfaction on pressures as high as 5,000 lbs. They are the product of the Homestead Valve Manufacturing Company, Pittsburgh, Pa.